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T. A. BRASSEY

1902

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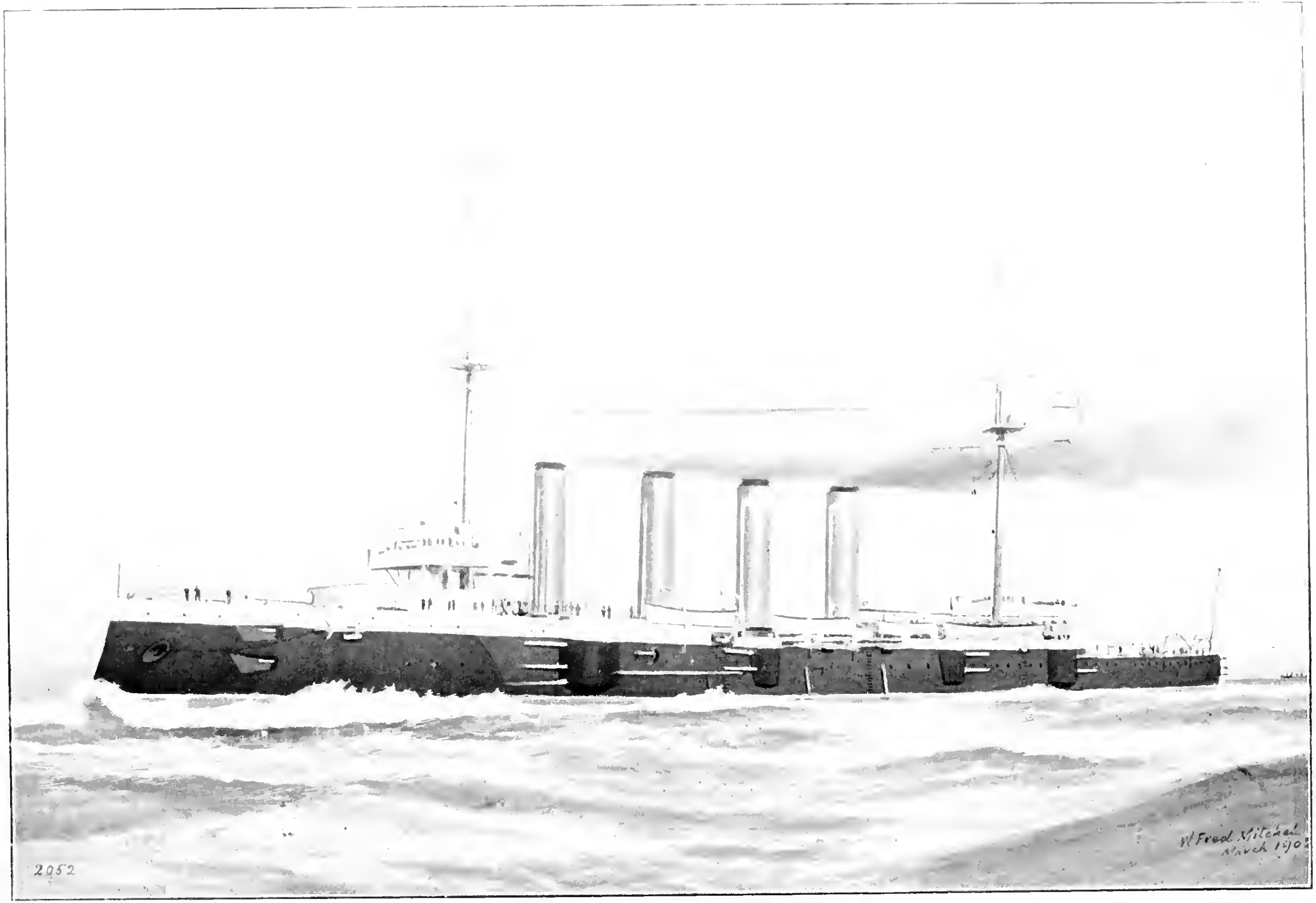

H.M.S. "GOOD HOPE."

THE

NAVAL ANNUAL,

1902.

EDITED BY

T. A. BRASSEY.

PART I.—Lord BRASSEY, K.C.B.; Commander C. N. ROBINSON, R.N.; Messrs. G. R. DUNELL, JOHN LEYLAND, J. R. THURSFIELD; and the EDITOR.

PART II.—Lists of Ships: Commander C. N. ROBINSON, R.N., and JOHN LEYLAND; Plates: S. W. BARNABY, M.I.N.A.

PART III.—Armour; Ordnance and Ordnance Tables.

PART IV.—FIRST LORD'S MEMORANDUM: BRITISH AND FOREIGN NAVY ESTIMATES.

1902.

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PREFACE.

The review of the progress of the British Navy during the past year shows that the rate of shipbuilding is improving, and that some of the leeway has been made up; but we are still much behind the standard of efficiency which was reached in H.M. dockyards when, under the superintendence of Admirals Sir Charles Fane and Sir Digby Morant, the Majestic and Magnificent were completed in less than two years. Portsmouth Dockyard is now crowded with ships in the completing stage. Many of these are contract-built, and have been handed over by the contractors in beautiful order. The waste of time in construction, and the waste of public money in damage to fittings by allowing contract-built ships to be pulled to pieces in the dockyards during the completing stage, are blots on our present system of administration. Contract-built ships should be completed for sea by the contractors, under the superintendence, if necessary, during the final stage of construction, of the officers who are to command the ships when commissioned.

The all-important question of the *personnel* of the Navy is dealt with in the present volume by Lord Brassey. The Board of Admiralty appear to be fully alive to the necessity of making a serious attempt to develop an adequate Naval Reserve. In this, as well as in other directions, increased efficiency is likely to accrue to our naval administration from the action of Lord Selborne and his colleagues.

A chapter on Mercantile Auxiliaries was to have been included in Part I., but the appointment by the Admiralty of a committee on this important subject, while it has prevented Professor Biles (who is to serve on the committee) from undertaking the work, has rendered such a chapter unnecessary. The decision of the Admiralty was made known too late to enable us to secure another paper to take the place of that referred to. Submarine navigation is a question which seems to call for special treatment, in view of the large number of submarine boats built and building for the French Navy. So little reliable information has, however, been made public as to the purposes or results of the most recent trials, that the chapter on submarines is in the main limited to a description of the boats already in existence. The fundamental difficulty of submarine navigation is that of vision. It is one which is far from having been satisfactorily overcome, and unless it is overcome it is to be hoped that the Admiralty will not go beyond their present policy of building

one or two boats a year, and putting them in the hands of a capable officer for experimental purposes. The menace of the submarine is far less serious than was the menace of the torpedo-boat ten years ago. The exaggerated importance attached at the time to the latter has been proved over and over again in the manœuvres, and is now generally recognised.

Part II. remains in the hands of Commander Robinson and Mr. John Leyland for the lists of British and foreign ships, and of Mr. Barnaby for the diagrams. To the latter many additions have been made. No one knows better than the present Editor how difficult it is to secure complete accuracy in a work embracing so many statistics, for some of which the information is not as reliable as could be wished. I would earnestly beg those who may detect real or apparent errors in the lists to point them out, in order that they may be corrected in future volumes.

Part III. will be found fully as suggestive and as interesting as the chapters on Armour and Ordnance in the *Naval Annual* of last year.

To Part IV. have been added two letters by Lord Brassey, reprinted from *The Times*, which appear to have had some influence on recent naval policy.

In conclusion, I wish to cordially acknowledge the assistance given in the preparation of the present volume for the press by Mr. Leyland, who has filled my place as Editor during the past two years when I have been unable to undertake the work.

T. A. Brassey.

April, 1902.

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PART I.

CHAPTER I.

Progress of British Navy.

During the year 1901–2 the following vessels have been completed:—Five battleships: Vengeance, Formidable, Implacable, Irresistible, and Bulwark; four armoured cruisers: Aboukir, Cressy, Hogue, and Sutlej; one first-class protected cruiser: Spartiate; one third-class cruiser: Pandora; the Royal yacht Victoria and Albert; four sloops, two river gunboats, 22 destroyers, and four torpedo boats. The above represent a large addition to the fighting strength of the British Navy, and the addition to be made in 1902–3 will be no less important, viz., five battleships and seven armoured cruisers, besides smaller vessels. Ships completed.

On April 1, 1902, there were under construction 13 battleships, 22 armoured cruisers, two second-class cruisers, two third-class cruisers, four sloops, two auxiliary vessels, ten destroyers, and five torpedo-boats. The number of first-class battleships building is greater than the number completed for any other Navy than our own, and we have under construction thrice the number of first-class cruisers completed for any other Power. Ships building.

Battleships completed. Vengeance. The Vengeance, 12,950 tons, is the last of the six vessels of the Canopus class, which belong to the 1896–7 programme. She was laid down at Barrow on August 23, 1897, and has been therefore over four years under construction. On the 30 hours' trial, at one-fifth of her power, the collective I.H.P. was 2885, the speed 11·35 knots, and the coal consumption 1·69 lbs. per I.H.P. per hour. On the 30 hours' trial, at four-fifths power, with 102 revolutions, she developed 10,387 I.H.P., which gave her a speed of 17·49 knots on a coal consumption of 1·5 lbs. On the eight hours' full-power trial, with 110·6 revolutions, the total I.H.P. developed was 13,852 and the speed 18·5 knots. The coal consumption was 1·72 lbs.

The following description of her gun trials is extracted from the *Times*: "The Vengeance is the first battleship built by Messrs. Vickers, Sons & Maxim, and she is also the only ship in the British Navy which has been built, engined, armoured, and supplied with her heavy gun mountings by one firm. She was ordered twelve

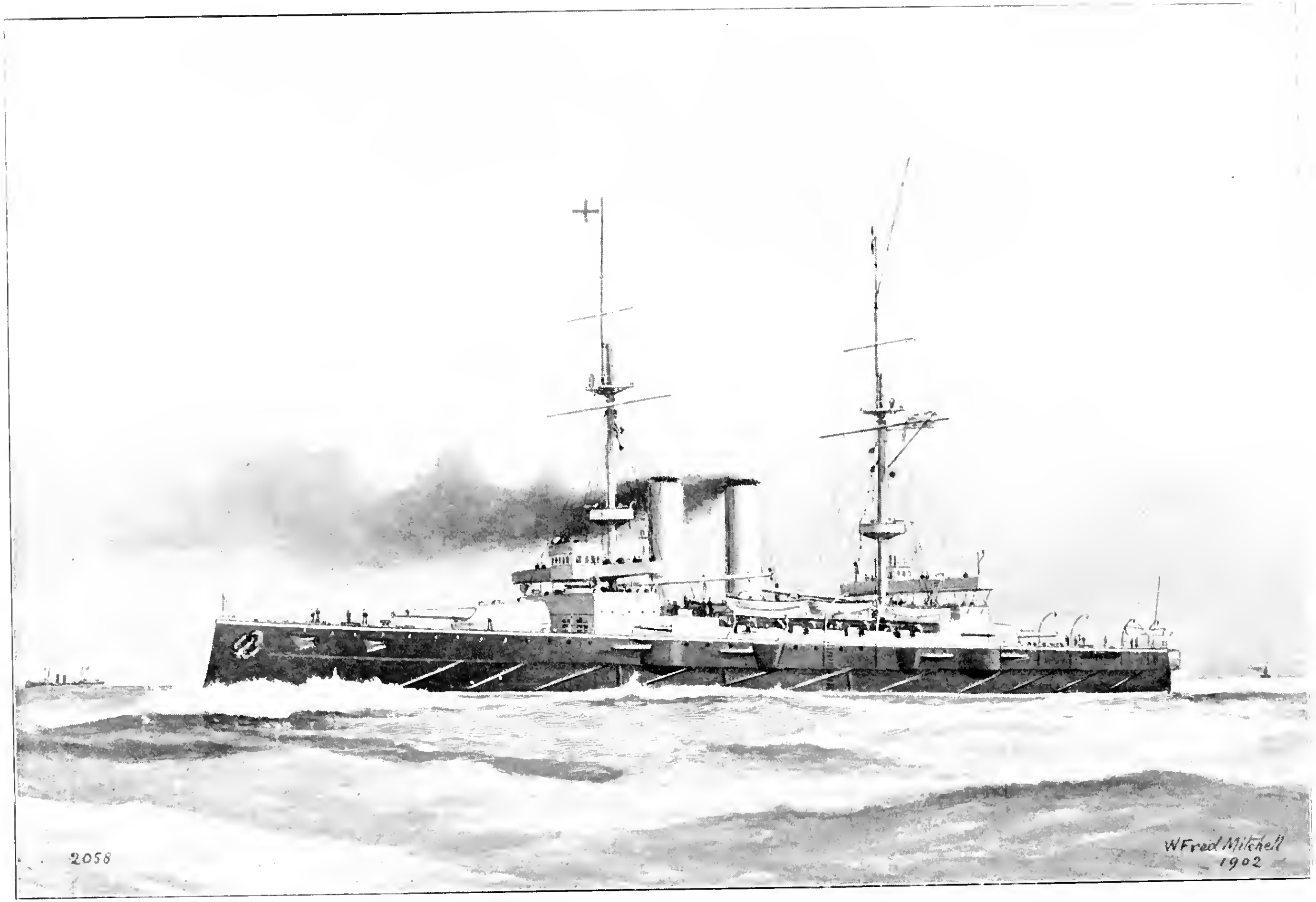
months later than her five sister vessels, the Canopus, Goliath, Ocean, Albion and Glory; and Sir William White, profiting by his experience in the interval, was enabled to effect some important improvements, such as better speed, greater protective strength, and a higher offensive power. The chief difference, however, between the Vengeance and her predecessors of the Canopus class is the new type of heavy gun mounting, by means of which the 12-in. guns can be loaded at all firing positions, whether of training or elevation. The Vengeance is also the last ship to be supplied with the Mark VIII. Woolwich guns, of 46 tons and 36 calibres in length, which, though not so powerful as the Vickers Mark IX. of 40 calibres, is still a formidable weapon, as it fires a projectile of 850 lbs. in weight, with a muzzle velocity of 2367 foot-seconds and a muzzle energy of 33,000 foot-tons. . . . . An important advantage afforded by the new mounting is that while the gun can be kept sighted on the object aimed at, the gear is simplified rather than complicated, as there are no locking bolts nor apparatus for working them. . . . . All the loading operations are carried out by hydraulic power, but simple fittings have been provided for the use of hand power as an alternative. The results were regarded as highly satisfactory, as it was shown that with a trained crew, and the machinery operated under ordinary working conditions, a rate of two rounds a minute could be maintained for a prolonged period."

Formidable class.

Of the six battleships of the Formidable class, four were laid down in 1898, viz.: The Formidable on March 21, at Portsmouth; the Implacable on July 13, at Devonport; the Irresistible on April 17, at Chatham; and the London on December 8, at Portsmouth. The two others were laid down in 1899, viz.: The Venerable on January 2, at Chatham, and the Bulwark on March 20, at Devonport. These ships were fully described in the *Naval Annual* of 1900. Their displacement is 15,000 tons, and their estimated speed is 18 knots with 15,000 I.H.P., under natural draught. All are fitted with Belleville boilers. The Formidable, Implacable, Irresistible and Bulwark have been commissioned for service on the Mediterranean station.

	At One-Fifth Power.			At Four-Fifths Power.			Full Power.		
	I.H.P.	Speed.	Coal.	I.H.P.	Speed.	Coal.	I.H.P.	Speed.	Coal.
			lbs.			lbs.			lbs.
Formidable	3281	11·5*	2·02	11,618	17·15*	1·89	15,511	18·13*	1·81
Implacable	3179	11·1	1·95	11,857	16·75	1·65	15,244	18·2	1·88
Irresistible	3243	11·76	2·4	11,626	17·5	2·09	15,603	18·2	1·97
Bulwark	3174	11·2	1·78	11,755	16·83	1·8	15,353	18·15	1·83
London	...	...	...	11,718	16·4	1·8	...	...	...

* Speed by measured mile, other speeds by log.



H.M.S. "QUEEN."

The London is to join the Channel Squadron for the Coronation Review. The Venerable is progressing more slowly. Particulars of the trials of the Irresistible were given last year, but are included in the table on opposite page, taken mainly from the *Engineer*, for the sake of comparison.

Battleships under construction. Duncan.

The Duncan class includes six battleships of 14,000 tons displacement and 15,000 I.H.P. Four were launched before March 31, 1901. The Albemarle and Montagu are completing at Chatham and Devonport respectively, and the Duncan at the Thames Ironworks, while the Russell has been delivered at Chatham from Jarrow. The Cornwallis was launched on July 17 at the Thames Ironworks, and the Exmouth was floated at Messrs. Laird's, Birkenhead, on August 28, with all citadel, barbette, and casemate armour as well as most of the auxiliary machinery in place. The Duncan class are the longest as well as the fastest battleships in H.M. Navy. Their estimated speed is 19 knots, as compared with the 18 knots of the Formidable and the Queen. By accepting 7-in. Krupp steel armour in place of 9-in. Harvey steel, the displacement, in spite of their length, is kept down to 14,000 tons, instead of the 15,000 tons of the Formidable class.

Queen.

The Queen and Prince of Wales were described in the *Naval Annual*, 1901. They have the same dimensions, armament, and speed as the Formidable class. The Queen was launched on March 8, 1902, at Devonport, by H.M. the Queen; the Prince of Wales on March 25, at Chatham, by the Princess of Wales.

Ships laid down.

In the King Edward VII., Commonwealth, and Dominion, of which a drawing has been kindly furnished by the Admiralty, the displacement is increased to 16,350 tons. Length, 425 ft.; beam, 78 ft.; draught, 26 ft. 9 in.; I.H.P., 18,000; speed, 18·5 knots under natural draught; coal capacity at load draught, 950 tons. The principal armament remains, as before, four 12-in. guns; but on the upper deck four 9·2-in. guns are mounted in casemates, two firing ahead and two astern—a most important addition. Ten 6-in. Q.F. guns are carried in a central battery, separated by armoured screens. This method of mounting the secondary armament is that adopted in the Japanese battleship Mikasa, built at Barrow, and was suggested as preferable to the casemate system in the article by the late Captain Orde-Browne and the Editor in the *Naval Annual* of 1896. In the new British ships there are, however, no longitudinal screens in rear of the guns, as in the Mikasa. The Edward VII. was laid down at Devonport. The Commonwealth and Dominion are being built by contract, one at Jarrow, the other at the Thames Ironworks.

Cruisers.

For over ten years the construction of armoured cruisers for the

British Navy was abandoned. The cruisers of the Naval Defence Act were protected by armoured decks. The Edgar and her sister ships, perhaps the most successful of the many types designed by Sir William White, carried no armour on their side. The Powerful and Terrible, protected by a deck 6 in. on the slopes, were the answer to the Russian Rurik, with her 10-in. belt. But with the completion of the Spartiate, the last of the Diadem class, the protected first-class cruiser disappears from the list of ships under construction.

Spartiate.

Armoured cruisers. Cressy class.

Of first-class armoured cruisers there are three types building. The Cressy and her five sister ships are of 12,000 tons displacement, and are protected by a 6-in. belt of Harveyed steel. The Cressy and Sutlej were launched at the end of 1899, the Aboukir and Hogue in 1900, and the Bacchante and Euryalus in 1901. The Cressy is in commission on the China station. The result of the trials of the other vessels of this class are given in the following table (from the *Engineer*). The Bacchante is not yet ready for sea, while the completion of the Euryalus, which was launched at Barrow on June 20, has been delayed by a fire in the yard, which did some damage to the ship. All are fitted with Belleville boilers.

	Builders and Makers of Machinery.	At One-Fifth Power.			At Four-Fifths Power.			Full Power.		
		I.H.P.	Speed.	Coal.	I.H.P.	Speed.	Coal.	I.H.P.	Speed.	Coal.
Aboukir ...	Fairfield ...	4597	14·4	1·9	16,274	20·2	1·77	21,375	21·6	1·84
Bacchante...	J. Brown & Co.	4624	13·6	1·8	16,445	20·6	1·75	21,520	21·7	1·7
Sutlej ...	J. Brown & Co.	4644	14·13*	1·99	16,602	20·63*	1·9	21,261	21·77*	2·36
Hogue ...	Vickers & Maxim	4738	13	2·09	16,456	20·15	2·05	21,432	22·06*	2·06

These vessels have thus considerably exceeded their estimated speed of 21 knots.

Cruisers under construction. Drake class.

The displacement of the four cruisers of the Drake class is practically the same as that of the Royal Sovereign and the Powerful, viz., 14,100 tons. They are protected by a belt of 6-in. armour, 11 ft. 6 in. in depth, extending for four-fifths of the length, tapering to 4 in. and 2 in. forward. At the after end of the belt there is a transverse bulkhead of 5-in. armour. Their designed speed is 23 knots, with 30,000 I.H.P. The Good Hope and Drake were launched respectively in February and March, 1901. The Drake has arrived at Portsmouth from Pembroke for her trials. The Leviathan was launched by Messrs. J. Brown & Co., at Clydebank, on July 3, and will be handed over to the Admiralty before the *Naval Annual* is published. The King Alfred was launched by Messrs. Vickers, Sons & Maxim, at Barrow, on October 28. The Good Hope was

* Speed on measured mile, other speeds by log.

handed over by her builders, the Fairfield Company, two months before the contract date, and has successfully passed through her trials. These are of such importance that a full description is given from the *Times*:—

There are 43 Belleville boilers, with economisers, supplying steam to two sets of four-cylinder triple compound engines, designed to develop together 30,000 I.H.P.; and throughout the trials everything worked most satisfactorily—a fact the importance of which will be more readily appreciated when it is stated that the official contract tests were carried out from day to day according to the original programme in an irreducible period of time; and the later series of progressive speed trials was delayed only one day, and that was owing to fog.

The first trial at one-fifth full power was of 30 hours' duration, and was to determine the radius of action for the coal supply carried—2590 tons—and as on this trial the rate of coal consumption was 1·87 lbs. per I.H.P. per hour, the ship may steam at 14 knots speed for 7000 nautical miles. On the second trial, also of 30 hours' duration, the test was very severe. No warship has ever steamed for so long a time at this power—22,703 I.H.P.; but everything went splendidly, and the coal consumption worked out to 1·83 lbs. per I.H.P. per hour. At this power four runs were made over the deep-sea course between Rame Head and Dodman Point, when it was found that the mean speed was 22·09 knots, and this agreed with the observations of Capt. Wilson, who was in command during the whole run, when the vessel went 60 miles west of the Scilly Isles.

On the eight hours' full-power run the power developed was 31,071 I.H.P., which is equal to 12·23 I.H.P. per ton of all machinery and 47·6 I.H.P. per ton of boilers—results far in excess of those realised in ships with cylindrical boilers, while in Atlantic liners of corresponding speed the power per unit of weight of all machinery is only 6 I.H.P. per ton. The speed on this trial was 23·05 knots. This is the mean of mean result of five runs over the deep-sea course in a heavy swell, which was not conducive to high steaming. The coal consumption on this run was 1·92 lbs. per I.H.P. per hour, and it should be noted that all the water lost throughout all the trials was made in evaporators run by the exhaust steam from the 75 auxiliary engines on board the ship, thus effecting a great economy.

Immediately after the contract trials there was a series of long-distance runs at progressive speeds, the deep-sea course of 22 knots west of Plymouth Sound being traversed three times at about 18 knots and three times at about 20 knots. On the first of these sets the mean of mean speed was 18·10 knots with the engines indicating 12,108 I.H.P., and on the second the result was 20·58 knots for 16,960 I.H.P. Having completed these runs on Wednesday, the vessel headed up Channel for Spithead, as the subsequent speed trials at low powers were to be made over the measured mile at Stokes Bay; and although it was a dark night, with a driving south-west rainstorm and by no means a smooth sea, a record trip for a warship was made, the time from outside Plymouth Breakwater to the Warner Lightship being slightly over six hours, giving a mean speed of nearly 20 knots. On the following day the Good Hope made four runs at 15 knots, 13 knots, and 10 knots speed at Stokes Bay. It was found that 2689 I.H.P. gave 10·6 knots, 5096 I.H.P. resulted in a mean of mean speed of 13·63 knots being got, while on the next series the average power was 7953 I.H.P. and the speed 15·91 knots. There was also a very severe test of the steering machinery, which, with the anchor and capstan gear, was supplied by Messrs. Napier Brothers, of Glasgow. The ship was driven astern at 18 knots while the helm was kept at various degrees up to hard over, and the result was very satisfactory, the steering mechanism standing the test.

The Drake and her sisters possess fine sea-keeping qualities and great speed. The cutting down of the upper works and the elimination of the boat deck, whereby some 50 to 60 tons weight is saved, and the absence of ventilators, are improvements.

A comparison of the principal features of the Drake with those of other large cruisers building for foreign navies will be of interest (see table on next page).

The maximum thickness of the armour on the belt and on the gun positions is 6 in., except in the case of the California, where it

does not exceed 4 in. The 9·2-in. guns of the Drake are mounted in barbettes forward and aft; the 6-in. guns in eight double-storeyed casemates. The 8-in. guns of the California are mounted in pairs. Of the fourteen 6-in. guns, eight are mounted in a central redoubt, protected by 4-in. armour. In the Gromoboi the armour is carried up to

	Date of Completion	Tonnage.	I.H.P.	Speed.	Maximum Coal Supply.	Armament.
					Tons.	
H.M.S. Drake .	1902	14,100	30,000	23	2500	2 9·2-in., 16 6-in.
U.S. California .	1903?	13,680	23,000	22	2000	4 8-in., 14 6-in.
R. Gromoboi .	1901	12,336	14,500	20	2500	4 8-in., 16 6-in.
Fr. Victor Hugo	1903?	12,500	27,500	22	2100	4 7·6-in., 16 6·4-in.

the upper deck, forming a central casemate, in which are mounted twelve 6-in. guns; one 6-in. gun is mounted right forward, and another right aft, on the main deck; the remaining two 6-in. guns being mounted one on each bow. The four 8-in. guns are mounted on the upper deck at each angle of the casemate. The feature of the Gromoboi is the large area of armoured side.

"County" class.

The Monmouth or "County" class,* of 9800 tons displacement and 23 knots speed, now comprises sixteen ships, including the six ships referred to below. The Kent was launched at Portsmouth on March 6, 1901; the Essex at Pembroke, in September; the Monmouth, by the London and Glasgow Shipbuilding Company, on November 13; the Bedford, by the Fairfield Company, on August 31; and the Lancaster at Elswick, on March 22nd, 1902. The Cornwall is building at Pembroke; the Suffolk at Portsmouth; the Berwick by Messrs. Beardmore & Co. (the well-known armour manufacturers, who now for the first time appear as contractors for shipbuilding for H.M. Navy); the Cumberland by the London and Glasgow Company; and the Donegal by the Fairfield Company.

Devonshire.

The above vessels carry an armament of fourteen 6-in. Q.F. guns, ten of which are mounted in casemates, and four in pairs in turrets, fore and aft. For the latter, two 7·5-in. guns are to be substituted in the six vessels of a slightly modified type already laid down or to be commenced during the year 1902–3. The following are the particulars of the Devonshire and her five sister ships:—Length, 450 ft.; beam, 67 ft.; displacement, 10,200 tons; speed, 23 knots.

The lines of the "County" class are extraordinarily fine, as will be seen from the plan in Part II. The bow gun is mounted very far forward, as in the Drake class. The weight of this gun and its protection, and of the heavily armoured conning tower, must

* For description, see *Naval Annual*, 1901, p. 22.

impose a great longitudinal strain on the ship; and it would be an improvement if these great weights could be carried rather further aft.

Second-class cruisers.

The Challenger and Encounter are building at Chatham and Devonport respectively. Their principal features are compared below with those of other recent second-class cruisers. The additional knot of speed is a great improvement.

	Displacement	Length.	Beam.	I.H.P.	Speed.	Armament.
Challenger . .	5880	355	56	12,500	21	11 6-in.
Hermes . . .	5600	350	54	10,000	20	11 6-in.
Dido class . .	5600	350	54	9600	19·5	5 6-in., 6 4·7-in.*
Arrogant class .	5800	320	57·6	10,000	19	4 6-in., 6 4·7-in.*

Third-class cruisers.

The Pandora, built at Portsmouth, is the last of the cruisers of the "P" class. On her natural draught trials she attained a speed of 19·18 knots with 5218 I.H.P. and a coal consumption of 2·33 lbs. On the forced draught trial, the I.H.P. developed was 7331, and the speed was 19·72 knots with a coal consumption of 2·5 lbs.

Amethyst.

Two protected cruisers of a new type, the Amethyst and Topaze, are to be built by Messrs. Beardmore. Displacement, 3000 tons; length, 360 ft.; beam, 40 ft.; mean draught, 14 ft. 6 in. Under natural draught the estimated speed is 20 knots, with 7000 I.H.P., and under forced draught $21\frac{3}{4}$ knots, with 9800 I.H.P. The armament comprises twelve 4-in. and eight 3-pdr. Q.F. guns. The coal capacity at load draught is 300 tons.

Sloops.

The Rinaldo, Vestal, and Mutine, of 980 tons displacement, sister ships to the unfortunate Condor, which was lost with all hands on the passage from Victoria, B.C., to Honolulu, attained speeds of 13·4, 12·4, and 13·6 knots respectively on their commissioning trials. They have been sent to the China station.

The sloops Fantôme, Espiègle, Odin, and Merlin are of 1070 tons displacement. The two last named were launched at Sheerness on November 30. The Espiègle, fitted with Babcock & Wilcox boilers, attained a speed of 13·5 knots on her trials. The Fantôme, fitted with Niclausse boilers, on the eight hours' full-power trial steamed 13·63 knots with 1453 I.H.P. The armament of these sloops comprises six 4-in. Q.F. guns, and the cost is £90,000. The Swallow and her sisters, launched over fifteen years ago, on a displacement of 1130 tons, carried eight 5-in. guns, and had a speed of 13·5 knots. The modern sloop represents no advance on her predecessors in the

* To be replaced by 6-in. guns.

most important elements of fighting power. Vessels of this class are only useful for police duties in peace time, and, except on certain stations, such as the East Coast of Africa and China, where vessels of light draught are required, those duties could be more effectively performed by a smaller number of second-class cruisers. They are practically useless for the purposes of war, as has been frequently pointed out in these pages, and would, in many cases, have to be laid up on the outbreak of hostilities. It is satisfactory to note that the number of sloops in commission on foreign stations is to be reduced.

Reconstruction. The reconstruction which is already in progress, or to be taken in hand during the financial year 1902–3, is of the most important character, and means a large addition to the fighting strength of the Navy. In the Royal Sovereign class it has been decided to put the six upper deck 6-in. Q.F. guns in casemates. The fact that of the secondary armament of these 14,000-ton battleships only four of the ten 6-in. guns were adequately protected has always been the great objection to the class. The secondary armament of the first-class Naval Defence Act cruisers, of about half the displacement, was as powerful. Had not the Admiralty decided to make this change, the Royal Sovereign and her seven sister ships would have had to be relegated to the list of second-class battleships. They will now be fairly entitled to rank with the Majestic class.

In the Barfleur and Centurion the 4·7-in. guns are to be taken out and replaced by ten 6-in. guns in casemates. For battleships of 10,600 tons a secondary armament of ten 4·7-in. Q.F. guns, only four of which were mounted in casemates, was lamentably weak.

Four 6-in. guns in casemates are to be added to the armament of the Powerful and Terrible. The casemates for the former were completed by Messrs. Vickers, Sons & Maxim in six weeks from the receipt of the order.

In the second-class cruisers of the Arrogant and Talbot classes (5600 tons to 5800 tons) all the 4·7-in. guns are to be taken out and replaced by 6-in. guns. The weak armament of these cruisers was severely criticised in the *Naval Annual* at the time of their construction.

It will be interesting to see how the increased weight of guns and casemates is to be compensated for in the above cases. Whether, as has been suggested, it is possible to give some protection to the secondary armament of the Admiral class or not, the decision to take first in hand more modern ships is certainly a wise one.

Torpedo craft. Twenty-two destroyers, four torpedo boats, and five submarines

have been completed during the year 1901–2. The following particulars of trials are taken from *Engineering*:—

TRIALS OF TORPEDO BOAT DESTROYERS AND TORPEDO BOATS DURING THE YEAR 1901

Name of Shipbuilder and Engineer.	Name of Vessel.	Approximate Displacement.	Type of Boiler.	I.H.P.	Speed in Knots.	Pounds of Coal per I.H.P. per Hour.
		tons.				
Laird	Express	427	Laird's	(*a*) 8722 (*b*) 8577	30·916 31·021	2·29 —
	Lively	332	,,	(*a*) 6456 (*b*) 6309	30·278 30·111	2·38 —
	Sprightly	332	,,	(*a*) 6437 (*b*) 6456	30·032 30·102	2·502 —
Palmers	Myrmidon	345	Reed's	(*a*) 6601 (*b*) 6313	30·134 30·229	2·2 —
	Kangaroo	346	,,	(*a*) 6488 (*b*) 6486	30·184 30·03 †	2·26 —
	Syren	353	,,	(*a*) 6665 (*b*) 6708	29·764 30·000	2·49 —
Vickers, Sons & Maxim	Vixen	3[illegible]0	Normand	(*a*) 6758 (*b*) 6961	29·389 29·797	2·41 —
Hawthorn, Leslie & Co.	Greyhound	340	Yarrow	(*a*) 6358 (*b*) 6141	30·157 30·337	2·345 —
	Roebuck	335	,,	(*a*) 6537 (*b*) 6591	30·346 30·181	2·38 —
	Racehorse	335	,,	(*a*) 6292 (*b*) —	30·179 30·345	2·378 —
Earle's	Bullfinch	320	Thornycroft	(*b*) 5886	Not	—
	Dove	324	,,	(*b*) 6059	taken	—
Yarrow	*Charger	..	,,	3746	25·331	—
	*Hasty	..	,,	3822	25·592	—
Thornycroft	No. 98, 1st C.T.B.	181	,,	(*a*) 2883 (*b*) 2975	24·982 25·523	2·44 —
	No. 99, 1st C.T.B.	185	,,	(*a*) 2667 (*b*) 2739	25·069 24·938	2·59 —
	No. 107, 1st C.T.B.	184	,,	(*a*) 2823 (*b*) 2899	25·053 25·206	2·325 —
	No. 108, 1st C.T.B.	182	,,	(*a*) 2876 (*b*) 2783	25·359 25·446	2·009 —

* Trials after re-boilering by Messrs. Earle. † Trial run in a gale.
(*a*) Three hours' full power coal-consumption trial. (*b*) Three hours' full-speed trial.

The Success, built by Messrs. Doxford, with 6597 I.H.P., attained a speed of 30·023 knots.

The Express was contracted for by Messrs. Laird at a speed of 33 knots. She made her first trials in October, 1898, and since then has been continuously under trial. The Albatross, built at Chiswick, was accepted last year with a speed of 31·55 knots. For short runs she did attain her contract speed of 32 knots. The Arab, another 32-knot destroyer, has also failed to attain the contract speed. The failure of these destroyers to attain the designed speed appears to be partly due, as pointed out in the *Engineer*, to the fact that new elements have to be taken into consideration in designing propellers for speeds of over 30–31 knots, and partly to the additional weights imposed on the boats to give them greater structural strength than was contemplated in the original design.*

* Mr. S. W. Barnaby read an interesting paper before the Institute of Naval Architects in March, 1902, on this subject.

The difficulties, as revealed in a recent Parliamentary return, which have been experienced with the trials of many British destroyers—the fact that some boats have been four years and more under trial, when compared with the rapidity with which destroyers have been built and accepted for the Japanese Navy by Messrs. Yarrow and Messrs. Thornycroft—seem to point to the desirability of concentrating the construction of this class of vessel in the hands of a few firms who have given special attention to the subject.

Viper and Cobra. It is most unfortunate that both of the destroyers fitted with Parsons' steam turbines should have been lost. The Viper was wrecked during the manœuvres in a fog on Bushon Island, near Alderney. The crew were all saved. The Cobra went down on the passage from the Tyne, where she was built, to Chatham, with the loss of a large part of her crew. The Court Martial on the Cobra disaster found that the loss of the ship was due to structural weakness. They also found that the Cobra was weaker than other destroyers, and that, in view of that fact, it was to be regretted that she was purchased into His Majesty's service.

Whether the Cobra was considered to have been sufficiently eased down, as even the largest ocean liners have to be eased down in really bad weather, does not appear from the proceedings of the court of inquiry. The finding of the Court Martial, and the fact that other destroyers have been in dockyard hands owing to buckling of plates and similar causes, has awakened serious anxiety in the public mind as to the structural strength of this class of vessel. It should, however, be borne in mind that the destroyer flotilla has not been handled very gingerly. Destroyers have been at sea in all weathers, and have no doubt sometimes been driven in bad weather. That under these circumstances some destroyers should have exhibited signs of weakness is but natural. The fact that Messrs. Yarrow* have sent to South America, China, Japan, and Australia, besides European ports, no less than fifty destroyers and torpedo boats, without having to make a claim on the underwriters, due either to structural weakness or breakdown of machinery, is, at any rate, important evidence of the seaworthiness of torpedo craft. A committee has been appointed by the Admiralty to investigate and report on the structural strength of destroyers.

Velox. A new destroyer, propelled — like the Cobra and Viper — by turbine engines, has been built by Messrs. Hawthorn, Leslie & Co., while the machinery has been made by the Parsons Company.†

* Mr. A. F. Yarrow's Letter to the *Times*, October 21, 1901.

† For description, *cf.* p. 163.

Ten new destroyers of a larger displacement and stronger construction have been ordered. The speed will be only 25½ knots, a reduction chiefly due to the conditions of trial, which has now to be made with bunkers full. M. Normand, in the destroyers recently constructed for the French Navy, has sacrificed speed to solidity of construction.

Five torpedo boats have been ordered from Messrs. Thornycroft. They will be the largest yet built, viz., 165 ft. long. The speed will be 25 knots. New torpedo boats.

Two river gunboats have been completed by Messrs. Yarrow. The Teal attained a speed of 13·045 knots as a mean of six runs on the measured mile. The load carried was 40 tons, and the draught 2 ft. 2¼ in. This is the first occasion on which so high a speed has been obtained on so light a draught. In the Moorhen the guaranteed speed of 13 knots was maintained for three hours with open stokehold, and during one hour wood fuel alone was used. River gunboats.

The Royal yacht Victoria and Albert attained a speed of 16·2 knots on her commissioning trials, with 5200 I.H.P., only half her boiler power being used. On the passage to Gibraltar and back she behaved admirably. Victoria and Albert.

The importance of fleet auxiliaries was strongly urged in the *Naval Annual* of last year by Admiral Sir John Hopkins. A repairing and distilling ship, the Assistance, and a distilling ship, the Aquarius, are in hand. Fleet auxiliaries

Ten years ago we had a large proportion of the merchant steamers of the highest speed. Owing to the subsidies given by foreign Governments, we have lost our pre-eminence in vessels of this class. Germany now possesses, or will shortly possess, eight or nine vessels capable of crossing the Atlantic at 22–23 knots speed, which, so long as we have no ships that could catch them, might do great damage to our commerce in time of war. The question of merchant cruisers was discussed at the summer meeting of the Naval Architects in 1901. A committee has been appointed by the Admiralty, at the suggestion of the Institution, to go into the subject; and an even more satisfactory evidence of the intentions of the present Board is the fact that the sum provided in the Navy Estimates for 1902–3 for the Royal Reserve of Merchant Cruisers has been increased by £55,687. Merchant cruisers.

The First Lord states in his Memorandum: "The numbers voted for the current year were 118,625 active service ratings. It is expected that the establishment will have been reached by the end of the financial year, as recruiting has been good. The numbers *Personnel.*

proposed for next year are 122,500." The increases will consist of the following ranks and ratings:—

Officers	266
Warrant Officers	143
Seamen	1500
Artisans and Electricians	250
Engine Room Artificers	150
Stokers	1000
Miscellaneous	400
Boys (Shipwrights and Coopers)	166
	3875

Increase in numbers.

The question of manning is fully dealt with in a subsequent chapter. In the year 1890, the first year in which the present writer was responsible for the editorship of the *Naval Annual*, the total numbers voted for the Navy were 68,800; the numbers proposed for 1902 amount to nearly double that figure. The votes for wages, victualling and clothing (votes 1 and 2), and the non-effective votes at the two periods, were as follows:—

	1890.	1902.
	£	£
Vote 1. Wages of Officers, Seamen, &c.	3,312,500	5,962,000
" 2. Victualling and Clothing	1,103,200	2,023,500
	4,415,700	7,985,500
Votes 13 and 14. Non-effective services	1,726,900	1,942,800
Total	6,142,600	9,928,300

The non-effective votes have not yet begun to feel the effect of the additions to the numbers voted in the last twelve years. During this period the increase in the number of the Royal Naval Reserve has been comparatively small.

Royal Naval Reserve.

Owing to the diminution of the number of British seamen in the Mercantile Marine, which has become a serious national question, this source of supply is decreasing. It must certainly diminish unless the Government seriously grapple with the question. The other sources of supply are the fishing and seafaring population, not only of the mother country, but of the colonies; the importance of which has been repeatedly urged on public attention by Lord Brassey and the present Editor.

Colonial Naval Reserve.

A beginning was made in the direction we had suggested by the embarkation of 50 Newfoundland fishermen for six months' training on H.M.S. Charybdis. "The experiment," telegraphed the *Times* correspondent at St. John's on the day after the Reservists' return, "is considered a complete success. No difficulty is anticipated in obtaining hundreds of volunteers henceforth." The misunderstanding between the Colonial Government and the Admiralty, as to the drill

ship which it was proposed to station in Newfoundland waters, will no doubt be removed.

Fleet Reserve.

The formation of the Fleet Reserve is a most important step in the right direction. The numbers borne on January 1st, 1902, were 7001. The numbers voted for 1902–3 are 10,500. The estimated increase in the year is 3200, about half of which will be due to transfers from the Pensioners' List, for which the numbers voted in 1902–3 are 5078, as compared with 6676 voted in 1901–2. The men who have served their time in the Navy are obviously the best material for the Reserve. It is something to have already 15,000 men available from this source; and it is to be hoped that these numbers may be doubled.

A review of the naval history of the past twelve years does not show a sufficiently serious attempt to grapple with the question of Naval Reserves. The policy of maintaining in peace time the number of men required to man the Navy in war time—which is that which has been pursued during these twelve years, with the complete sanction of Parliament—is wasteful of the national resources. But a strong Naval Reserve is not only needed on the ground of economy. It is also needed to enable us in case of war to make use of the enormous potential resources which we possess in this country for shipbuilding. The appointment of a strong Committee, of which Sir Edward Grey is chairman, to consider how far the manning of the Navy may be supplied by Naval Reserves, including the proposal for the establishment of a Naval Volunteer Reserve, which is again taking shape in the hands of Mr. Chadwyck Healey, is an evidence that the Government propose to give serious attention to this vital question.

Training.

Exercise with masts and yards, Lord Selborne plainly states in his Memorandum, is not considered essential for the proper training of officers or seamen. This announcement is a not unexpected sequence of the abolition of the sailing-ship training squadron, and will, it is to be feared, result in a deterioration of the quality of both officers and men. For the present there is an adequate supply of both officers and men trained in sailing ships; but before many years are past we will probably have to follow the example of the United States Navy, as well as of some of the greatest shipping companies, and re-establish sailing training squadrons for the education of a proportion of both officers and men.

Coaling at sea.

The experiments conducted on board the Trafalgar with an improved Temperley transporter appear likely to lead to a successful solution of the problem of coaling at sea. The Trafalgar, during the

operation, steamed head to sea at a speed of from 8 to 10 knots, towing the collier astern of her. The rate maintained for 2 hours 55 minutes was 30 tons an hour, but it is believed that this can be increased to 45 tons an hour, or about a third of the rate attained in harbour under favourable conditions. It would diminish the quantity of coal to be transferred if the collier could tow the battleship during the operation of coaling.

This review of the progress of the British Navy cannot be concluded without, first, an expression of satisfaction at the vigorous efforts being made by the present Board of Admiralty to increase our naval strength in various directions, the importance of which has been urged for many years in these pages; and secondly, an expression of deep regret that Sir William White, for so many years the Director of Naval Construction, has found it necessary to resign, on account of ill-health, the post which he has filled so well. All our 41 first-class battleships, the Barfleur and Centurion, 47 first-class cruisers, and 47 second-class cruisers, built or building, besides a host of smaller vessels, sloops, destroyers, &c., are due to the designs of Sir William White. No naval constructor has had such responsibility on his shoulders; few, if any, have ever left, or ever will leave, so great a mark on the shipbuilding policy of their country or their time.

T. A. Brassey.

CHAPTER II.

FOREIGN NAVIES.

FRANCE.

THE shipbuilding work for the French Navy is being carried forward in accordance with the programme described in the *Annual* last year (pp. 33, 34), and more fully in the volume for 1900 (pp. 31–4). This measure is still operative, though, owing to the recent action of the Budget Committee in dealing with the estimates of 1902, its financial continuity was threatened, and there is a possibility that its features may be varied.* According to its provisions four battleships should have been put in hand in 1902, but one only will be begun, the three others being inserted in the list in order that contracts may be entered into and some preparations for them made. It is worth noting that the delays in completing recent ships for the French Navy have been fully as great as for our own. Programme.

The following were the vessels launched in 1901:—Armoured cruisers: Desaix, Sully, Dupetit-Thouars, and Léon Gambetta; destroyers: Rapière, Flamberge; sea-going torpedo-boats: Siroco, Typhon, Bourrasque; submarines: Français, Algérien, Farfadet, Lutin, Gnome, Korrigan; submersibles: Sirène, Triton, Espadon, Silure; transport despatch vessel: Vaucluse (of little value, continued after being suspended many years). Launches.

The following were the vessels laid down in the same period:—Battleships: République, Patrie; armoured cruiser: Victor Hugo; destroyers (10): Francisque, Sabre, Dard, Baliste, Mousqueton, Arc, Pistolet, Bélier, Catapulte, and Bombarde; submarines (23): Naïade, Protée, Perle, Esturgeon, Bonite, Thon, Souffleur, Dorade, Lynx, Ludion, Loutre, Castor, Phoque, Otarie, Méduse, Oursin, Grondin, Anguille, Alose, and Truite; also larger experimental boats of a new type, Q 35, Q 36, Q 37; first-class torpedo-boats (12): Nos. 266–277. Vessels laid down.

The only large ship completed during 1901 is the battleship Iéna, which, after many delays, has passed through her trials at Brest. Her displacement is 12,052 tons, and the estimated speed with 15,500 I.H.P. was 18 knots. The Iéna has already been described Battleships. Iéna.

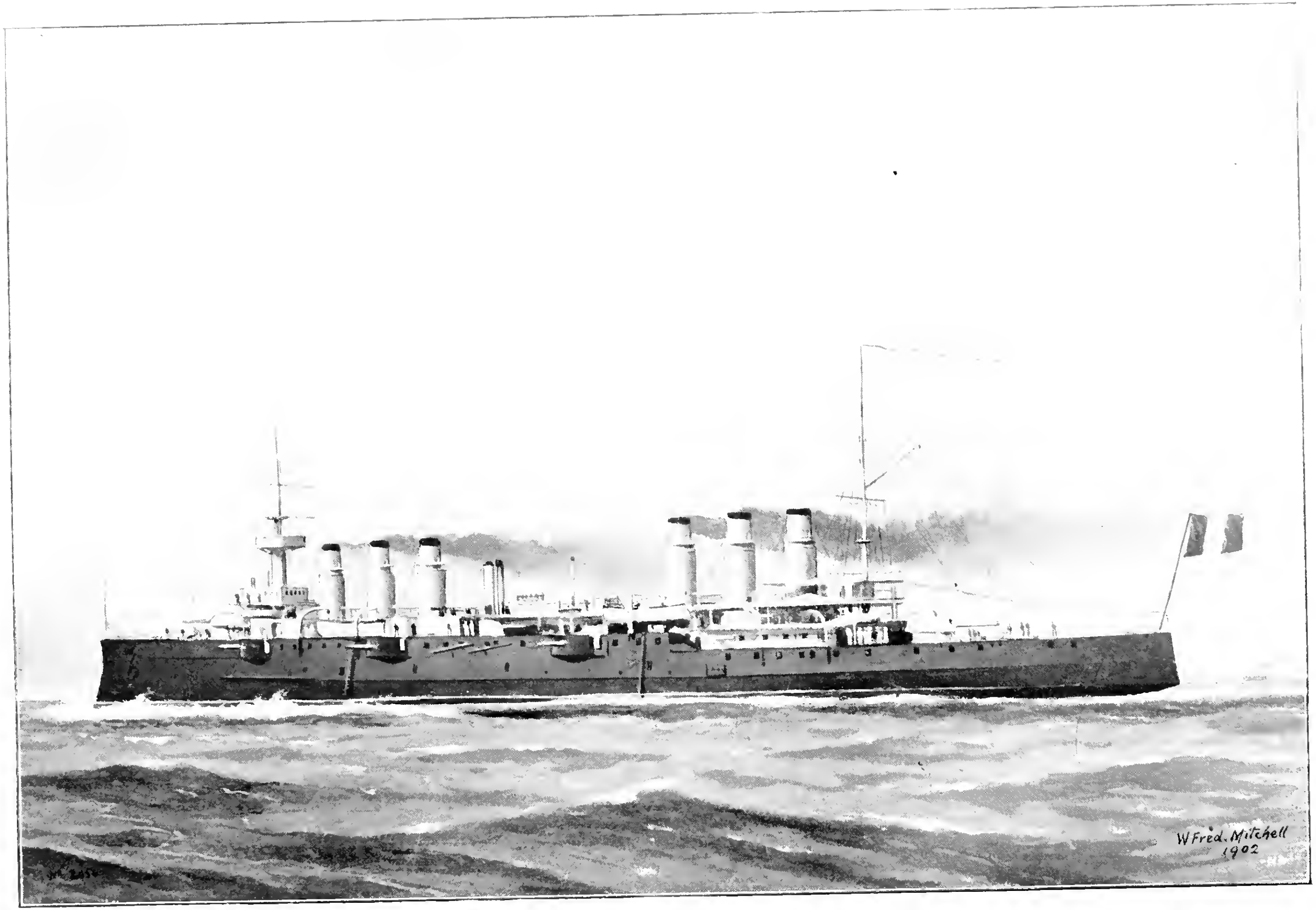
* By a vote of the Chamber, however, on March 8, the ships struck out by the Committee were reinserted in the list.

in the *Naval Annual*, but the following particulars from *Le Yacht* may be given here:—"Her ordinary supply of coal or petroleum residuum is 820 tons, giving her a radius of action of 5200 miles at 10 knots: or she can carry 1100 tons of packed briquettes in her bunkers, when her radius of action will be 7000 miles at 10 knots. The armament consists of four 12-in., eight 6·4-in., eight 3·9-in., sixteen 1·8-in., besides smaller guns. She can fire two 12-in., four 6·4-in., and four 3·9-in. guns fore and aft. The armour-belt runs her whole length, and its maximum thickness is 13·78 in. Flush with the upper and lower edge of the armour-belt are two armour decks, and between them is a cellular structure which encloses the various magazines and store-rooms. Above the armour-belt is a light armour varying from 2·36 in. to 4·72 in., which extends right round the ship, but leaves a width of ship's side of more than three feet unprotected between the armour-belt and the 2·75-in. armour of the casemates. The Iéna was ordered on April 3, 1897." On her trials she attained a speed of 18·2 knots with 16,500 I.H.P., and a coal consumption of 1·7 lbs. per H.P. The trials with petroleum fuel were considered highly satisfactory. On the gunnery trials the elevating gear of one of the guns broke, causing considerable delay in the completion of the vessel.

Henri IV. The trials of the second-class battleship Henri IV. have been much delayed owing to the non-delivery of her machinery. She is of 8948 tons displacement. The estimated speed, with 11,500 I.H.P., is 17 knots. This vessel was fully described in the *Annual*, 1900.

Suffren. The Suffren was launched at Brest in 1899. Displacement 12,728 tons; I.H.P., 16,500; speed, 18 knots. She is fitted with Niclausse boilers. The normal coal supply is 1100 tons, which can be increased to 1820 tons. The armament comprises four 12-in. guns, ten 6·4-in., and eight 3·9-in. Q.F. guns, the distribution of which will best be understood by reference to the Plate. Four of the 6·4-in. guns are mounted in a casemate amidships protected by 5-in. armour; the remaining six singly in turrets on the upper deck. The Suffren is protected by a complete water-line belt 12 in. thick amidships, rising to a height of 3 ft. 7 in. above the water-line. There is no unarmoured space between the belt and the lower edge of the casemate armour, as in the Henri IV.

République. Patrie. Two battleships have been laid down from the designs of M. Bertin—the République at Brest, and the Patrie at La Seyne. Displacement, 14,865 tons; length, 434 ft. 10 in.; beam, 79 ft. 7 in.; draught of water aft, 27 ft. 6 in. The hull is protected by a belt 11 in. thick at the water-line amidships, and 9·8 in. thick at the upper edge, tapering to 7 in. at the bow and $5\frac{1}{2}$ in. at the stern. The



FRENCH ARMOURED CRUISER "JEANNE D'ARC."

belt rises to a height of 7 ft. 6 in. above the water-line amidships, and to 8 ft. 6 in. above the water-line at the stern. There are two armoured decks placed respectively at the upper and lower edges of the belt. The lower deck has a thickness of $2\frac{3}{4}$ in. on the sloping sides, and 2 in. on the horizontal portion. The upper or splinter-deck (*pont de ricochet*) is 2·4 in. thick. The space between the two armoured decks is divided into numerous compartments, and appropriated as coal bunkers, magazines, &c. The side is further protected by $2\frac{1}{2}$-in. armour, rising to a height of 17 ft. above the water-line forward. It is carried down to 3 ft. 4 in. below the water-line at the stern, in order to afford protection to this portion of the vessel when pitching.

The principal armament, as in the case of most British battleships, consists of four 12-in. guns mounted in pairs in closed turrets forward and aft. The secondary armament includes eighteen 6·4-in. Q.F. guns, some mounted in an armoured redoubt, others in pairs in closed turrets, as compared with twelve 6-in. Q.F. in the Queen and Prince of Wales. There are twenty-six 1·8-in. Q.F. guns and five torpedo tubes, only two of which are submerged; the three others being protected by light armour.

The propelling machinery consists of three vertical triple expansion engines, each driving a propeller. The boilers will be of the water-tube type. The estimated speed with 17,475 I.H.P. is 18 knots. That of the Queen is 19 knots with 20,000 I.H.P. The normal coal supply is 905 tons, which can be increased to 1825 tons, giving a radius of action of 7000 miles at 10 knots.

New battleship.

One battleship (A 11) is provided for in the estimates of 1902, and will be put in hand. She will be of the République class. Three others, A 12, A 13, A 14, also figure in the programme, but it is stated that they will be delayed, owing to the new State gun factory not being in working order, thus retarding the supply of ordnance.

The Budget Committee have struck out of the estimates the votes for the third-class battleships Friedland and Vauban, as being no longer effective ships.

Cruisers. Jeanne d'Arc.

Turning to cruisers, the Jeanne d'Arc, an armoured cruiser of 11,329 tons displacement and an estimated speed of 23 knots, has given much trouble on her trials. She failed to get over 18 knots with her 28,000 I.H.P. Her engines were to run at 120 revolutions, as in the case of our later cruisers; but before 110 revolutions were reached they developed great heat in nearly all the bearings, which, it is said, were inadequate in surface. There are on board 36 boilers of the small tube express type, and it is said that the feed arrange-

ments became choked, with the result that five of them got red hot; but in no case was any damage done. There is some talk of replacing the boilers, which are of the Guyot type, with those of some other design.

Château-renault.

The commerce destroyer Châteaurenault has attained the high speed of 24·148 knots on her preliminary trials with 24,964 I.H.P. The estimated speed was 23 knots with 23,000 I.H.P. The bronze bearings were found unsatisfactory and are being replaced by steel, which is delaying by some four or five months the completion of the ship for service. The Châteaurenault is only protected by an armoured deck, and she carries only two 6·4-in. and six 5·5-in. Q.F. guns, on a displacement of 8,018 tons. *Le Yacht* states that while the boilers are good the machinery is defective for high speeds, and is of opinion that the high cost (over £600,000) of a cruiser so weak in offensive and defensive qualities renders it unlikely that the type will be repeated in the French Navy.

The commerce destroyer Guichen has been struck off the active list while under repair.

Armoured cruisers.

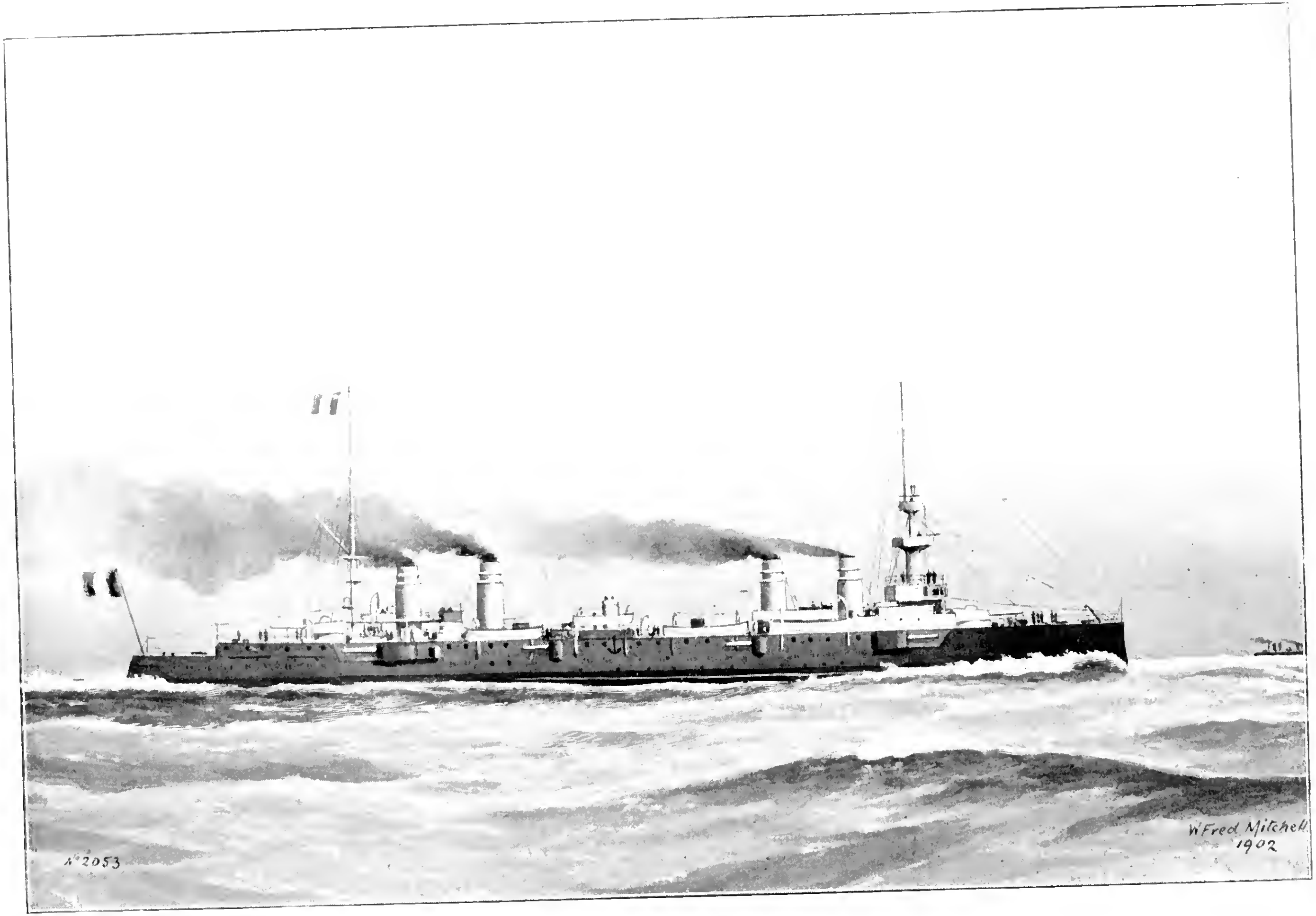
The new construction of the French Navy is mainly concentrated on armoured cruisers. Of these there are no less than four classes in various stages of construction.

Desaix.

The Desaix, Dupleix, and Kléber are of 7700 tons displacement, 17,100 I.H.P., and 21 knots speed. The Desaix was launched at St. Nazaire by the Société des Ateliers et Chantiers de la Loire on March 21, 1901. The normal coal supply is 880 tons, which can be increased to 1200 tons; the radius of action with the former is 6450 miles at 10 knots and 1216 miles at 21 knots; with the latter, 8800 at 10 knots and 1650 at 21 knots. Armament: eight 6·4-in. guns in four turrets, four 3·9-in., ten 1·85-in., and four 1·45-in. guns; also two torpedo tubes. The space between the armour deck and the next deck above is filled with a cellular structure which is watertight and protected by the armour-belt. The armour-belt is 4·33 in. thick at the water-line. The idea is that the cellular structure will keep the vessel afloat, even when she is damaged below the water-line. The vessel is intended for distant stations, and on that account has wood and copper sheathing. The Dupleix, launched in 1900 at Rochefort, has commenced her trials. The Kléber is still on the stocks at Bordeaux.

Dupetit-Thouars.

The Dupetit-Thouars, Amiral de Gueydon, and Montcalm are of 9517 tons displacement and 21 knots speed. The belt armour has a maximum thickness of 6 in., and the armament comprises two 7·6-in., eight 6·4-in., and four 3·9-in. Q.F. guns. The Montcalm, which was launched at La Seyne in 1900, on her preliminary trials



FRENCH ARMOURED CRUISER "MONTCALM."

in September, 1901, attained a speed of 20·85 knots with 18,200 I.H.P. The machinery and boilers are reported by *Le Yacht* to have given every satisfaction. The Gueydon is nearly ready for her trials at Lorient. The Dupetit-Thouars was launched at Toulon on July 5, 1901.

The Condé, Gloire, and Sully have the same general features as the Dupetit-Thouars, but the displacement is increased to 10,014 tons; length, 453 ft.; beam, 66 ft.; draught, 24 ft. 9 in. Her estimated speed is 21 knots with 20,000 I.H.P. The normal coal supply is 970 tons, which can be increased to 1590 tons, giving a radius of action of 6500 miles and 10,400 miles respectively at 10 knots. The complement comprises 25 officers and 590 men. The Sully was launched at La Seyne in July, 1901. The Condé was launched at Lorient on March 12, 1902. The Gloire was launched in 1900 and is well advanced. The Marseillaise, launched in 1900, and Amiral Aube, on the stocks at Brest and St. Nazaire respectively, are of the same class, but have some slight differences in the smaller armament and protection of smaller guns. Cost of Condé, £808,000, including £91,000 for armament. Condé.

The Léon Gambetta, Jules Ferry, and Victor Hugo are of 12,550 tons displacement; length, 480 ft. 7 in.; beam, 71 ft. 2 in.; draught, 27 ft. The Léon Gambetta was launched at Brest on October 26, 1901. The Jules Ferry was laid down in 1901 at Cherbourg, and the Victor Hugo at Toulon. The following particulars are taken mainly from *Le Yacht*:—Protection is afforded by a continuous belt rising to a height of 7 ft. 7 in. above the water-line amidships. Its maximum thickness is 7¾ in., tapering to 5 in. From the belt to the upper deck the side is protected by 2·2-in. armour. The armament comprises four 7·6-in. Q.F. guns, mounted in turrets forward and aft; sixteen 6·4-in. Q.F. guns, of which four are mounted on the main deck in casemates, and twelve in pairs in six turrets on the upper deck. The turrets are so disposed that ten 6·4-in. guns (including two of the main-deck guns) can fire ahead or astern. There are five torpedo tubes, of which two are submerged. Twenty-eight Niclausse boilers furnish steam to three vertical triple-expansion engines, each driving a propeller. The estimated speed is 22 knots with 27,500 I.H.P. The coal endurance is 12,000 miles at 10 knots, and the complement will be 38 officers and 690 men. The cost of this vessel is £1,169,940, including armament, £158,792. Léon Gambetta.

Another vessel of the Victor Hugo class, C 14, is to be laid down, of which *Le Yacht* gives the following particulars:—Length, 479 ft.; beam, 70 ft.; displacement, 12,550 tons; number of engines, three, with a total of 27,500 I.H.P.; speed, 22 knots. She will carry four

7·6-in. guns in turrets forward and aft; sixteen 6·48-in. guns, twelve in pairs in turrets and four in casemates; twenty-two 1·85-in. guns; and five torpedo tubes, two submerged. Her armour-belt will be 6·7-in. in thickness, and be surmounted by a $2\frac{1}{3}$-in. protection extending to the upper deck. She will have two armour decks, the lower of which will be 2·56 in. in thickness.

The second-class cruiser Jurien de la Gravière, of 5650 tons displacement and 23 knots speed, which was launched in 1899, has been commissioned for her trials.

Torpedo craft.

Amongst the small craft added to the Navy during 1901 were the sea-going torpedo boats Audacieux, Trombe, Siroco, Mistral, and Simoun, of 26 to 28 knots; the Borée and Tramontane, of nearly 30 knots; several first-class torpedo boats of 25 knots, and the two destroyers Pique and Epée, which have been found deficient in stability. The destroyer Pertuisane is ready for her trials. The sea-going torpedo boat Siroco, built by M. Normand, has attained a speed of 28·727 knots on her trials, with 355 revolutions. The Siroco, which is of 180 tons displacement, belongs to a new type, the principal features of which are greater strength in construction, better protection, and a lower designed speed than the destroyers of the Javeline class or the sea-going torpedo boat Bourrasque. The Mistral, Simoun and Tramontane, of the same type as the Siroco, have been launched, and the first named exceeded the estimated speed by over a knot on her trials. The Trombe, which was damaged by running on a rock, has been repaired. The Bourrasque was launched August 31; estimated speed, 30 knots. Torpedo boats Nos. 254–256, of 86 tons displacement, have been launched.

A turbine torpedo boat, the Libellule, is under construction at Havre. The Lansquenet, which, though built in 1893, has never completed her trials, is to be sold.

Submarines and submersibles.

Of the submarines, the Français and Algérien have entered the service at Cherbourg, and the Farfadet and Lutin have begun their trials at Rochefort. The four submersibles Siréne, Triton, Espadon, and Silure have undergone their trials successfully at Cherbourg. The chief improvement in submersibles has been the reduction in the time required to submerge them. A list of the new boats ordered to be put in hand in 1902 is given above. Three experimental submersible boats of larger type are in hand at Cherbourg, Rochefort, and Toulon, and have been designed respectively by MM. Romazotti, Maugas, and Bertin. Thirteen other submarine boats are in the list of new constructions, but will probably not be put in hand until 1903, for completion in the following year. The types are described in Chapter VIII.

The reconstruction of the Requin has been completed. The two 16·5-in. guns have been replaced by two 10·8-in. guns. The saving in weight has enabled two 3·9-in. Q.F. guns to be added to the secondary armament. The speed attained on trial was 15·3 knots with 6250 I.H.P. The reconstruction of the Dévastation is not yet completed. That of the Furieux has been commenced, while the Neptune is to be taken in hand during the present year. Refits or reconstructions.

The armoured cruiser Dupuy de Lôme, the cruiser Jean Bart, the third-class cruisers Coëtlogon, Tronde, and Forbin, are to be fitted with new boilers or repaired.

The cruisers Iphigénie, Duquesne, and Tourville have been struck off the list.

The "Artillerie et Infanterie de la Marine" were transferred to the War Department under the law of July 7, 1900, and are now known as the Colonial Army. The Navy provides 7000 men of the Inscription Maritime for manning those batteries at the naval bases which bear on the seaward approaches of the harbour or roadstead. The submarine boats, the torpedo boats of the *défense mobile*, and the shore signalling service absorb over 7000 more. This leaves of the 51,000 voted some 37,000 for the rest of the sea service. There are now estimated to be available 117,000 officers and men when the French naval forces are completely mobilised. *Personnel.*

Germany.

The increase of the German Navy is being conducted in accordance with the programme (1901–16) fully described in the *Annual* for 1900 and 1901, but some indications seem to show that at the expiration of the first building period (1901–5) additions will be made to the programme to provide other cruisers for foreign service. The complete establishment provided for by the law, including four battleships and seven cruisers as a reserve, is:— Programme.

38 battleships,
14 large cruisers,
38 small cruisers.

The following is the progress made towards the creation of the battle fleet indicated:—

Sachsen class	4
Oldenburg	1
Brandenburg class	4
Kaiser class	5
Wittelsbach class	5
H and J (1901)	2
K and L (1902)	2
Siegfried class	8
	31

By the close of the first building period six other battleships (two yearly) will have been put in hand, and the last addition, making up the number 38, is assigned to the year 1909, and is for the reserve. The Siegfried class are counted as battleships until they are replaced by new ships, and battleships are to be regarded as obsolete after 25 years. The building of substitutes for old ships will begin in the second building period, 1906–9.

Of the 14 large cruisers the Prinz Adalbert is the twelfth, and the building of substitutes for the older vessels (König Wilhelm, Kaiser, Deutschland) has been entered upon. Towards the 38 small cruisers, L is the thirty-third, and during the year a substitute for the oldest of the class, the Zieten, is to be begun. The sum provided in the German Navy Estimates for new construction in 1902 is £3,679,197, or approximately the same as that provided in 1901.

Battleships completed.

The remaining ships of the Kaiser class, 11,150 tons, have passed through their trials, and are to be in commission in 1902. The Kaiser Barbarossa, on the natural draught 50 hours' trial, attained a speed of 15·5 knots, with 7360 I.H.P., 94 revolutions, and a coal consumption of 1·83 lbs. per I.H.P. On the six hours' full-speed trial she steamed at 18 knots, with 13,940 I.H.P., and 112·8 revolutions. The Kaiser Karl der Grosse underwent her trials at the close of last year, but suffered some damage through touching the bottom, and her machinery was somewhat injured in consequence.

Battleships launched.

During the five years 1886–1890 no battleship was launched for the German Navy. During 1891–1895 four, and during 1896–1900 six battleships were launched. The year 1901 has seen the launch of no less than five first-class battleships, a striking evidence of the increased activity in shipbuilding for the German Navy.

Wittelsbach class.

The Wittelsbach class, like the Kaiser class, comprises five ships. The Wittelsbach was launched in 1900. The remainder were launched in 1901—the Wettin (ex. D) by Messrs. Schichau, at Danzig, on June 6; the Zähringen (ex. E) at the Germania Yard, Kiel, on June 12; the Schwaben (ex. G) at Wilhelmshaven, on August 24; and the Mecklenburg (ex. F) at the Vulcan Yard, Stettin, on November 9. The Wittelsbach class are 17 ft. longer and have 1 ft. 4 in. more beam than the Kaiser. The displacement is 11,800 tons as compared with 11,150 tons. The armament is the same, but differently distributed. The 5·9-in. Q.F. guns of the Kaiser class are each mounted singly in turrets or casemates. In the Wittelsbach class, eight of the 5·9-in. guns are mounted in a central battery, and two forward in casemates on the main deck, while four are mounted forward in casemates and four in turrets on the upper deck.

The distribution of the armament gives these ships a powerful bow fire from two 9·4-in. guns, and from no less than eight 5·9-in. Q.F. guns. The position of two of the latter, right under the muzzles of the 9·4-in. guns, appears objectionable, while the muzzles of the turret 5·9-in. guns on the upper deck are immediately above the forward and after gun-ports of the central battery. The minor armament comprises twelve 3·4-in. Q.F. guns with shields, twelve 1·4-in. Q.F. guns, and eight machine guns. There are five submerged torpedo tubes, and one in the stern above water. Protection is better than in the Kaiser class, and is afforded by a complete belt of Krupp steel from 8 to 9 in. thick for three-fourths of the length, and tapering to 4 and 5 in. at the ends. The central battery is protected to the level of the upper deck by 5½-in. armour, marking a great improvement upon the preceding class. The armour on the turrets for the 5·9-in. guns is 6 in. in thickness. The 9·4-in. guns are protected by 10-in. armour. There is a 3-in. protective deck. The propelling machinery consists of three independent triple-expansion engines, developing 14,000 I.H.P. The estimated speed is 18 knots. The normal coal supply is 700 tons, which may be increased to 1450 tons; while 200 tons of liquid fuel are carried, as compared with 100 tons in the Kaiser class. The crew number 715.

Battleships laid down.

Two battleships were laid down in 1901, viz., H at the Germania Yard, Kiel, and J by Messrs. Schichau, at Danzig. The displacement is 13,200 tons. For the construction of two others, K and L, £161,527 apiece is provided in the Estimates of 1902. The increased displacement permits of better protection, a more powerful armament, and greater coal endurance than in the Wittelsbach class. Four 11-in. guns are substituted for the four 9·45-in. guns, and eighteen 6·7-in. Q.F. guns take the place of 6-in. Q.F. The estimated speed is 19 knots with 16,000 I.H.P. The ships will have six cylindrical and eight Schulz water-tube boilers.

Reconstruction.

Three more coast defence battleships of the Siegfried class—the Beowulf, Hildebrand, and Heimdall—are under reconstruction, which is to give them greater length and coal capacity. They are almost ready.

Armoured cruisers.

The armoured cruiser Prinz Heinrich, of 8870 tons displacement and 20 knots speed, has been completed.

The armoured cruiser Prinz Adalbert (ex. B) was launched at the Germania Yard, Kiel, on June 22. Displacement, 9050 tons; I.H.P., 16,000; speed, 21 knots. Protection is afforded by a complete water-line belt, 7 ft. 6 in. in depth, 4 in. in thickness amidships, tapering to 3 in. at the extremities. Above the belt there is a citadel protected by 4 in. of hardened steel, and extending for 164 ft. There

is a curved armoured deck, $1\frac{1}{2}$ in. thick on the horizontal portion and $2\frac{3}{4}$ in. thick on the slopes. The armament comprises four 8·2-in. guns (instead of two 9·4-in. guns as in the Prinz Heinrich) mounted in turrets forward and aft, protected by 6-in. armour, and ten 6-in. Q.F. guns. Of the latter, six are mounted in the armoured redoubt on the main deck, and four in oval turrets on the upper deck, between the 6-in. main-deck guns. There are twelve 3·4-in., ten 1·4-in. Q.F., and four machine guns, and four torpedo tubes, one forward and two on the broadside being submerged, and one aft above water. The propelling machinery consists of three four-cylinder triple-expansion engines, in three separate compartments, to which steam is furnished by 14 Dürr water-tube boilers. The normal coal supply is 950 tons, which can be increased to 1500 tons. The crew numbers 528.

Another armoured cruiser, the Ersatz König Wilhelm, of the same type, has been laid down; a second, the Ersatz Kaiser, is provided for 1902; and a third, to replace the Deutschland, is projected. The Ersatz König Wilhelm is being built by Messrs. Bloem & Voss, Hamburg, and is to be launched towards the end of the present year. An illustration and criticism of this ship, comparing her with recent German and other cruisers, appeared in the *Engineer* of December 27, 1901 (see opposite page).

The *Engineer* critic approves the increase in the armoured area in these ships, but believes that 4-in. armour is too thin, and that the 4-in. armoured cruiser, of which the British "County" class and the U.S. St. Louis are examples, is likely to be a transient type. On this criticism, it may be remarked, an increase in the area of armoured side can only be obtained, other conditions being equal, by a reduction in the thickness of the armour. The bases of the turrets of the principal guns are better protected than in the "County" class. On the other hand, the secondary guns are clustered together amidships, whereas those of the "County" class are well distributed. The British cruisers have an advantage in speed of 2 knots.

Cruisers. third-class.

The Ariadne, Niobe, Nymphe, and Thetis, of 2665 tons, have passed through their trials. The Ariadne steamed 22·18 knots with 8827 I.H.P., while the Thetis attained a speed of 21·75 knots on her six hours' forced draught trial. The Nymphe maintained a speed of 19 knots for three days with 5624 I.H.P. The Niobe, on a similar trial, attained a speed of 19·45 knots. Three others of an improved type, G, H, and J, are under construction, and three more, K, L and the Ersatz Zieten, are to be laid down in 1902. Length, 360 ft.; beam, 40 ft. 4 in.; displacement, 2715 tons; speed, 24 knots.* G and

* These particulars are somewhat doubtful.

Name.	Prinz Heinrich.	Prinz Adalbert and new ship.	Japanese Iwate.	British "County" class.	U.S. St. Louis.	French Montcalm.
Displacement, tons	8930	9048	9800	9800	9700	9517
Length, feet	394	394	400	440	423	453
Beam, feet	65½	65½	68½	66	65½	64
Draught (mean), feet	23½	23¼	24½	24½	23¼	24½
Armament	2 9·4-in. 10 6-in. 10 3·4-in. 10 1-pdr., 4 Maxims	4 8·2-in. 10 6-in. 12 3·4-in. 10 1-pdr., 4 Maxims	4 8-in. 14 6-in. 12 3-in. 12 small	14 6-in. 10 3-in. 3 3-pdr., 8 Maxims	14 6-in. 18 3-in. 12 1-pdr., 10 automatic.	2 7·6-in. 8 6·4-in. 4 4-in. 16 3-pdr., 6 1-pdr.
Submerged torpedo tubes	3	3	4	2	..	2
Above-water torpedo tubes	1	1 (armoured)	..	..	..	..
Armour	Krupp	Krupp	Krupp	Krupp	Krupp	Harvey-Nickel
Belt	4-in.	4–3¼-in.	7–3½-in.	4–2-in.	4-in.	6–4-in.
Deck	2-in.	2-in.	2½ in.	2-in.	3-in.	2-in.
Lower deck, side	4-in.	4-in.	5-in.	4–2-in.	4-in.	4–2-in.
Length of this belt	150 ft.	215 ft.	200 ft.	350 ft.	115 ft.	440 ft.
Bulkheads, lower deck	4-in.	4-in.	5-in.	5-in. (aft)	4-in.	6-in. (aft)
On main guns	6-in.	6-in.	6-in.	5-in.	4-in.	6-in.
Protection to main gun bases	6-in. tubes, conical	6-in. tubes, conical	6-in. complete barbettes	8-in. shallow barbette and hoist only	..	4-in. big tube
Secondary guns	4 in turrets, 6 in battery, 4-in. armour on all	4 in turrets, 6 in battery, 4-in. armour on all	10 in 6-in. casemates, 4 unprotected	10 in 4-in. casemates	4 in 4-in. casemates, 8 in 4-in. battery, 2 unprotected	6·4-in. in 4-in. casemates with unprotected bases, 4 4-in. unprotected
Screws	3	3	2	2	2	3
I.H.P.	15,000	17,000	14,500	22,000	21,000	19,600
Speed, knots	20	21	20·75	23	21·5	21
Coal (normal), tons	1500	1500	550	800	650	1000
Coal (maximum), tons	1700	1700	1300	1600	1500	1600
Boilers	14 Dürr	14 Dürr	Belleville	Various	Babcock & Wilcox	Normand

H are building at the Weser Yard, Bremen, and J at the Howaldt Yard, Kiel.

The gunboat Panther, sister of the Luchs, has been launched at Danzig. Length, 203 ft. 6 in.; beam, 30 ft. 4 in.; displacement, 977 tons; I.H.P., 1300; estimated speed, 13½ knots. She will carry 120 tons of coal, and with this supply will be able to steam 3000 miles at 10 knots. The Panther and Luchs are a little larger than the Jaguar class. The gunboat B is to be laid down in 1902.

The destroyer S 107, the last of the second division of six launched by Messrs. Schichau, of Elbing, during 1901, was launched

on October 21. S 106 steamed at 28 knots on a forced draught trial; displacement, 350 tons. Six others of a similar type are to be built at Elbing. G 108, the first of six boats, was launched at the Germania Yard, Kiel, on September 7, and G 109 in December. Displacement, 360 tons; I.H.P., 6000; speed, 27 knots.

The third-class cruiser Wacht foundered as the result of a collision with the Sachsen in September. No lives were lost.

Personnel. The increase of the Navy has necessitated a corresponding increase in the *personnel*. This is provided for under the law governing German shipbuilding policy, as follows:—

Year.	Line officers.	Other *personnel*.	Total.
1900	876	22,476	23,352
1905	1179	31,187	32,366
1910	1482	39,898	41,380
1915	1785	48,609	50,394
1920	2088	57,320	59,408
Total increase, 1900–1920	1212	34,844	36,056

The Navy Bill therefore provided that the *personnel* should be more than doubled in the next twenty years. These figures must be accepted with caution, as there has been a disposition to accelerate the programme. The numbers voted in 1901 were 31,157 officers and men. The increase in 1902 comprises 111 officers, 120 warrant officers, and 2128 petty officers and seamen.

At the same time it should be remembered that coast defences are being gradually transferred to the Navy. In 1901 about 3700 officers and men, with large reserves to draw upon, were employed to garrison the whole of the works at Wilhelmshaven, Kiel, Bremerhaven, Cuxhaven, and Heligoland, and for the water defences, such as submarine mines.

Italy.

The Navy Estimates provide for an expenditure of £829,629 on new construction in 1902, as compared with £844,444 in 1901.

Battleships completed. The Ammiraglio di St. Bon and the Emanuele Filiberto, of 9800 tons displacement, have completed their trials. The estimated speed under natural draught was 16 knots with 9000 I.H.P., and under forced draught 18 knots with 13,500 I.H.P. The engines of the former were constructed by Messrs. Ansaldo from the designs of Messrs. Maudslay. Steam is furnished by twelve ordinary cylindrical boilers. The results of the six hours' trial under natural draught were as follows:—I.H.P., 10,407; speed, 17·4 knots; coal consumption, 1·87 lbs. per I.H.P. per hour. The results of the 1½ hours'

trial under forced draught were: I.H.P., 14,296; speed, 18·3 knots; coal consumption, 2·19 lbs. The Emanuele Filiberto, built at Castellamare, with forced draught maintained the same speed for two hours, the mean power being 14,000 I.H.P. The engines were built by Messrs. Hawthorn & Guppy, of Naples.

The Regina Margherita was launched at Spezia in May and the Benedetto Brin from the Royal Dockyard at Castellamare on November 7. The principal dimensions of these powerful battleships are:—Length, 426 ft. 6 in.; beam, 78 ft.; draught, 27 ft. 4 in.; displacement, 13,427 tons. The estimated speed with 19,000 I.H.P. is 19·5 knots. The armament is a powerful one, and comprises four 12-in. guns mounted in barbettes forward and aft, and protected by 10-in. armour, four 8-in. guns mounted in turrets on the upper deck, twelve 6-in. Q.F. guns in the redoubt on the main deck, and sixteen 3-in. Q.F. The armour on the water-line belt, which is 10½ ft. deep, is 6 in. thick amidships, tapering to 2 in. at the extremities; that on the redoubt 6 in., and that on the barbettes 8 in. in thickness. The armoured deck is 3 in. thick on the slopes, and 1½ in. thick on the horizontal portion. The armour is of hard steel, made at Terni. The Regina Margherita has Niclausse, the Bendetto Brin Belleville boilers. The normal coal supply is 1000 tons, giving a radius of action of 5000 miles at 10 knots. This supply can be increased to 2000 tons. The complement is 682 men and 37 officers. Battleships launched.

The Regina Elena has been laid down at Spezia and the Vittorio Emanuele III. at Castellamare. They represent a novel type. Their dimensions are as follows:—Length, 435 ft. 6 in.; beam, 73 ft. 6 in.; draught of water aft, 27 ft. 3 in.; displacement, 12,624 tons. The estimated speed is 22 knots with 20,000 I.H.P. The belt armour has a maximum thickness of 10 in., that on the turrets for the principal guns is 8 in. thick, that on the casemates and battery 6 in., while the protective deck is 4 in. thick on the slopes. The armament comprises two 12-in. guns, mounted singly in turrets forward and aft; twelve 8-in. Q.F., to be mounted in six turrets, three on each side, the amidship turrets being on a higher stage; twelve 3-in. Q.F., and twelve 1·8-in. Q.F. guns. The normal coal supply is 1000 tons, which can be increased to 2000 tons. A feature of the ships is their relatively low freeboard, though they are higher forward than other Italian battleships. Battleships laid down.

Three battleships of the same type as the Vittorio Emanuele are to be laid down during the current year—A at Castellamare, B at Spezia, and C at Venice.

The battleship Italia is to be fitted with new boilers and much of the wooden backing removed. Refits.

Armoured cruisers. The Francesco Ferrucio, of 7350 tons displacement, will probably be launched in April, 1902. Her sister ships, the Garibaldi and Varese—the former fitted with Niclausse and the latter with Belleville boilers—were submitted to comparative trials in October, 1901. At the first trial, of 24 hours' duration, the Garibaldi overtook the Varese, which started twelve miles ahead of her. The Garibaldi developed 7000 I.H.P. with from 86 to 88 revolutions, and the speed was 17 knots. Only 16 of the 24 boilers were lighted, as was the case in the Varese. The coal consumption was 1·78 lbs. in the Garibaldi, and a little less in the Varese. The *Italia Militare e Marina* says, in relation to these trials, that any judgment as to the comparative merits of the boilers is premature pending a complete examination of the reports.

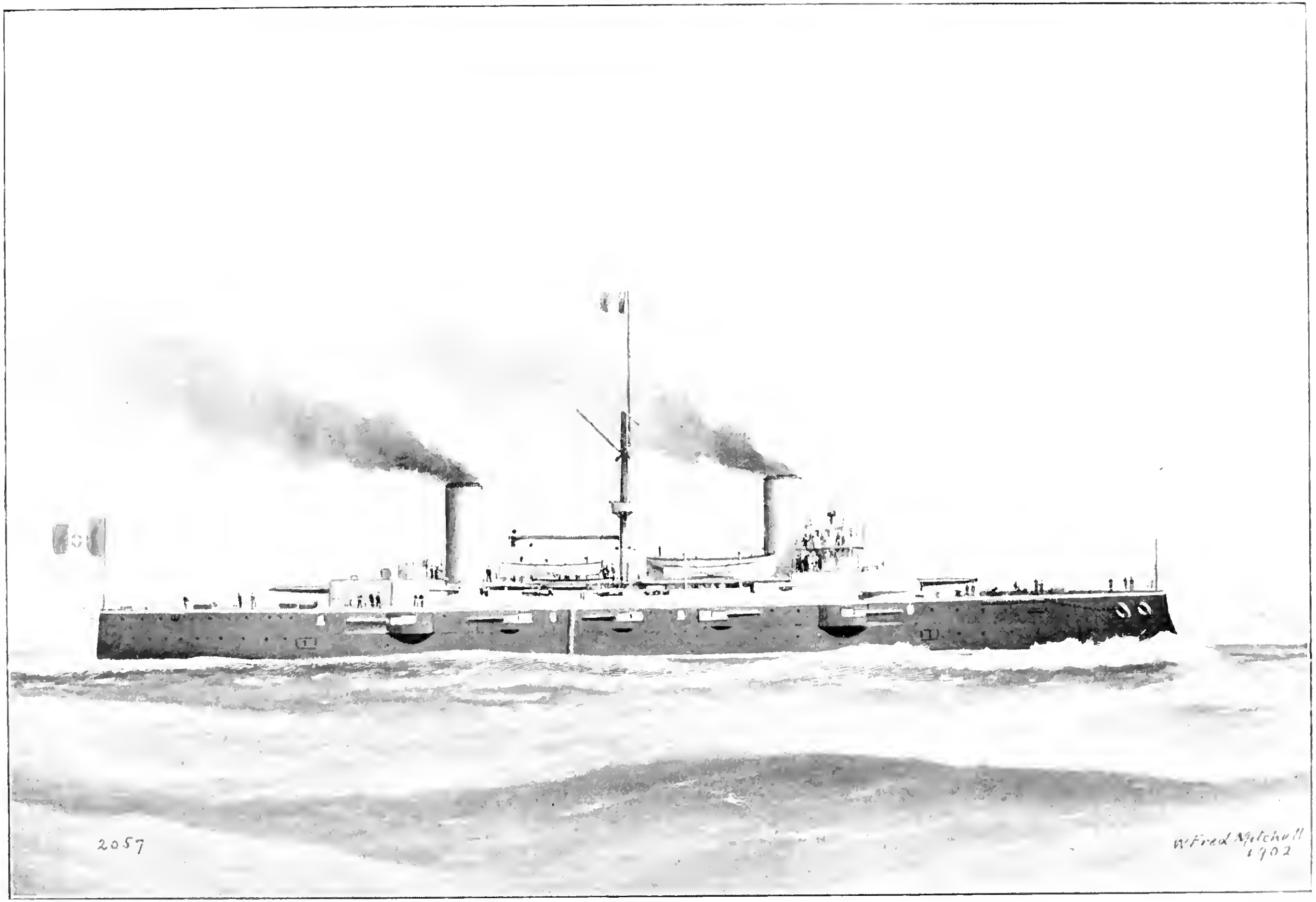
The torpedo cruiser Agordat, 1313 tons, has passed through her trials. On the six hours' natural draught trial, the I.H.P. was 4670, and the speed 18·8 knots. On the three hours' forced draught trial, 8550 I.H.P. was developed, and the speed was 22·2 knots with 252 revolutions.

The *Escrcito Italiano* says that the torpedo cruisers Monzambano and Confienza are to be struck off the list this year. The Cariddi has been sold.

Destroyers. The torpedo boat destroyer Ostro, sister of the Lampo, Freccia, and three others, was launched at Elbing in February, 1901. All six have been completed. The Nembo was launched at the Pattison yard, Naples, in May. She is the first of six of the same type, all of which are to have a speed of 30 knots, and her measurements are:—Length, 210 ft.; beam, 19 ft. 6 in.; maximum draught, 7 ft. 6 in.; displacement, 350 tons; I.H.P., 6000. She will be armed with one 12-pdr. and five 6-pdr. guns, and will have a coal capacity of 80 tons. Her boilers will be of the Thornycroft type. The Turbine, a sister ship to the Nembo, was launched from the Pattison yard on November 21, and has attained a speed of over 30 knots.

Submarine boats. The submarine boat Delfino has been submitted to further trials. Her dimensions are:—Length, 79 ft. 2 in.; diameter, 9 ft. 1 in.; displacement, when completely submerged, 107 tons.

Personnel. The number of men serving in the Navy on December 31, 1900, was 23,028, viz., 1780 officers; seamen, 8450; gunners, &c., 4645; engineers and stokers, 5406; coast defence, 4527. The number of recruits liable to serve in the Navy, including those whose cases had been adjourned from previous years, was 12,095. The total number which could have been called up to serve with the colours was 6147, all under 32 years of age. The Navy provides the *personnel* for the semaphore stations, mine-fields, and guns defending the mine-fields



ITALIAN ARMOURED "CRUISER GIUSEPPE GARIBALDI."

at the naval ports. The best Italian seamen are now obtained from the fishing class.

Russia.

The Russian Navy estimates for 1902 only slightly exceed the total for 1901. The sum to be spent on new construction and repairs is approximately the same—viz., £2,670,000.

The battleships Pobieda and Peresviet have completed their trials. They are of 12,674 tons displacement, and the estimated speed is 18 knots with 14,500 I.H.P. There is a slight difference in the beam and draught of these two ships. The armament is the same, but while the Pobieda has a complete belt 9–4 in. thick, the belt of the Peresviet extends for only five-sixths of her length, but is from 9–7 in. in thickness. The Pobieda, on a forced draught trial, without her armour on, is reported to have attained a speed of 18·5 knots, developing 15,492 I.H.P. The Peresviet, by official Russian accounts, attained a speed of 19·12 knots with 13,775 I.H.P. She left Cronstadt on October 24, bound for the Pacific; and grounded on the Island of Langoland, but was successfully refloated. The Pobieda is expected to follow in the autumn. Battleships completed.

The Kniaz Potemkine Tavritchesky passed successfully through her preliminary trials. Displacement, 12,480 tons; estimated speed, 17 knots, with 10,600 I.H.P. She is an improved Tria Sviatitelia, the chief improvements being a high bow and a more powerful armament. She carries sixteen 6-in. Q.F. in place of the eight 6-in. Q.F. guns carried by her prototype. The thickness of the belt armour is reduced from 13 in. to 9 in. That on the battery is 5 in. in both cases. Kniaz Potemkine

The Retvizan, which was built by Messrs. Cramp, of Philadelphia, attained an average speed of 18·8 knots for twelve hours on her trial. She is to proceed to the Far East in June, 1902. Retvizan.

The Borodino, laid down at the New Admiralty Yard, St. Petersburg, in May, 1899, was launched on September 8, 1901. The Emperor Alexander III., laid down at the Baltic Yard, St. Petersburg, on September 5, 1899, was launched on August 3, 1901. These two battleships are of the same type as the Orel, building at the Galerny Yard, and the Kniaz Souvaroff, building at the Baltic Yard, St. Petersburg. Displacement, 13,600 tons; estimated speed, 18 knots, with 16,000 I.H.P.; length over all, 397 ft.; between perpendiculars, 376 ft. 5 in.; beam, 76 ft.; mean draught, 26 ft. Protection consists in a Krupp steel belt, extending from the bow to the after barbette, 9 in. thick at the water-line, tapering to 4 in. at the lower and 7 in. at the upper edge. The central redoubt is protected by Battleships launched.

6-in. armour. The armoured bulkheads are 9 in. in thickness. The armament comprises four 12-in. guns, mounted in elliptical turrets forward and aft, protected by 10-in. armour. The forward guns are 31 ft. and the after guns 23 ft. above the water-line. Twelve 6-in. Q.F. guns are mounted in six turrets on the sides, in such manner that eight can be fired ahead and eight astern. Of the twenty 3-in. Q.F. guns, twelve are mounted in the battery, four forward on the upper deck, and four aft on the main deck. There are six torpedo tubes, of which two are submerged. The above particulars are extracted from *Le Yacht*, and may be taken as referring to the other ships of the same class. The Slava, a sister ship, has been laid down at the Baltic Yard, St. Petersburg, and the *Engineer* states that a battleship of the same type as the Kniaz Potemkine has been laid down at Nicolaieff. The Alexander III. and Oslabya will be under trial in 1902.

Armoured cruiser Bayan.

The armoured cruiser Bayan has been completed at La Seyne, and is expected to leave for the Far East in August, 1902.

The Pamyat Azova is to be refitted, and, like the battleship Ekaterina II., will receive Belleville boilers. The armoured cruiser Minin is to be fitted as a training ship.

Protected cruisers.

The protected cruiser Diana, of 6630 tons, is reported to have attained a speed of 19·3 knots with 12,129 I.H.P., on her forced draught trials. The Pallada, a sister ship, steamed 19·2 knots with 13,100 I.H.P. The Aurora, the third cruiser of this class, is nearly completed, and will undergo trials in 1902.

Bogatyr.

The protected cruiser Bogatyr, built at the Vulcan Yard, Stettin, is stated to have attained a speed of 24 knots on her builders' trials, her engines developing 20,500 I.H.P. It is expected that she will be ready for her official trials in April, 1902. The Askold, of the same type as the Bogatyr—displacement, 6100 tons—was built at Kiel, and has been delivered at Cronstadt. She has nine Schulz boilers, and, with 24,000 I.H.P., has an estimated speed of 24 knots.

Two other cruisers building at Windau and Libau respectively closely resemble the Bogatyr.

Vitiaz.

The Vitiaz was laid down at Galerny Island, St. Petersburg, on November 3, 1900; but owing to a serious fire at the yard on June 13, 1901, she was practically destroyed when about 700 tons of metal had been built into her. Her length is 414 ft.; beam, 52 ft. 5 in.; draught, 20 ft. 7 in.; displacement, 6375 tons. The engines are of 19,500 I.H.P., supplied by 16 Normand boilers, and the estimated speed 23 knots.

Kagul.

The chief dimensions of the Kagul, building at the Nikolaieff Admiralty Yard, and Otchakoff, laid down at Sebastopol, are as

follows:—Length on water-line, 436 ft.; beam, 52 ft.; mean draught, fully equipped and with 720 tons of coal in bunkers, 20 ft. 7 in.; and displacement, 6250 tons. The engines, constructed by the Nikolaieff Shipbuilding and Engineering Co., are to be twin-screw triple expansion, developing in the aggregate 19,500 I.H.P., and capable of giving the vessel a speed of 23 knots.

The armament of these cruisers comprises twelve 6-in., twelve 3-in., and four 1·85-in. Q.F. guns. Of the twelve 6-in. Q.F. guns, says the *Engineer*, four will be mounted in pairs in turrets on the poop and forecastle, four singly in casemates on the upper deck, two firing ahead and two astern. The remaining four guns, mounted two on each side of the upper deck, are fitted with large armoured shields. The turrets are protected by 5 in. of hardened steel in front and $3\frac{1}{2}$ in. of soft nickel steel at the back. The casemate armour is $3\frac{1}{8}$ in. thick in front and $1\frac{3}{8}$ in. thick at the back. The ammunition hoists for the turret and casemate guns are protected by 3 in. nickel steel. The protective deck has a thickness of $1\frac{1}{4}$ in. on the horizontal portion, and $2\frac{7}{8}$ in. on the sloping sides. The plate given in Part II. is taken from the *Engineer*. It will be observed that the Bogatyr and her four successors differ from the Varyag in having a high poop as well as a high forecastle.

Third-class cruisers

The Boyarin was launched at the yards of Messrs. Burmeister & Wain, Copenhagen, on June 8. The following are the particulars:—Length, 355 ft. over all; between perpendiculars, 347 ft. 10 in.; beam, 41 ft. 6 in.; draught, 16 ft.; displacement, 3200 tons. Steam is supplied by 16 Belleville boilers with economisers. The capacity of bunkers is 600 tons; radius of action, 5000 miles at 11 knots. The Boyarin will carry six 4·7-in., eight 1·85-in., two 1·45-in., one Baranovski landing gun, and two Maxim guns; also five torpedo tubes, one aft and four on the broadside above water for 17-ft. Whitehead torpedoes. The armour deck, which is 2 in. thick on the slopes, will run nearly her whole length. The weak point in the design is that the engines are not entirely below the water-line, and are not covered by the armoured deck. Where they protrude above it they are protected by an armoured dome. The complement will be 14 officers and 320 men. The estimated speed is 25 knots with 18,000 I.H.P.

Novik class.

The Novik, of similar type to the Boyarin, built at Elbing, is reported to have attained a speed of 26 knots on her trials. She is fitted with Thornycroft-Schulz boilers. The Almaz, also of the same type, has been laid down at the Baltic Yard, St. Petersburg. A sister-ship has been ordered from Messrs. Schichau, of Elbing, the Jemtchug and Izumrud are in hand at the Nevsky yards, while the

Kalgoula is said to have been laid down at Nicolaieff; a seventh of the same class, the Oleg, at the New Admiralty Yard, St. Petersburg.

Destroyers. Five destroyers, of 312 tons displacement and 27 knots speed, have been built by the Forges and Chantiers de la Méditerranée at Havre. The Forel was delivered at Cronstadt in October. The Kephal was launched in November. The others are the Osetr, Losos, and Sterliad.

The Gagara attained a speed of 26·54 knots on her trials. The Voran, built at the Nevsky Engineering Works, attained a speed of 27·5 knots; while the Nyrok, of the Sokol type, made a speed of 26·18 knots, and the Filine, built at the Neva works, made 26·94 knots. The Baklan was launched from the Neva Shipbuilding Works in August; displacement, 350 tons; I.H.P., 6000; speed, 31 knots.

Torpedo boats. Five torpedo boats of the Cyclone type have been ordered at the Nevsky Engineering Works. Speed, 25 knots.

Training transport. The Okean, training transport, 12,000 tons, has been launched at Kiel. The maximum speed will be 15 knots, and the vessel at reduced speed has a range of 10,000 miles with 500 tons of coal; besides carrying a cargo of 4000 tons. In addition to being a coal transport she is to be used as an instructional ship for engineers and stokers, and for that purpose is fitted with Thornycroft-Schulz, Yarrow, Belleville, and Niclausse boilers.

The Smolensk, of 11,000 tons, 16,500 I.H.P., and 20 knots speed, has been completed by Messrs. Hawthorn, Leslie & Co. for the Volunteer Fleet.

New docks. Owing to the increase of the Russian Fleet in the Far East, it has been decided to construct three large dry docks in 1902—one at Port Arthur and two at Vladivostock.

Personnel. The total *personnel* in 1901 consisted of 2131 officers and 57,957 men.

United States.

The Navy Estimates for 1902–3 show an increase of over £4,000,000 over those for the previous year, the biggest increase being under the head of yards and docks. The appropriations for 1901–2 amounted to £1,392,166; those proposed for 1902–3 amount to £4,270,291. The amount proposed for the increase of the Navy is somewhat less than that appropriated in 1901–2.

New programme. The Secretary of the Navy, in his report dated November 4, 1901, remarks that the Navy is a far greater factor in the relations of the United States with the world than it was before the recent

national expansion, which now includes Porto Rico, the Hawaiian Islands, the vast area of land and sea in the Philippines, and obligations in Cuba. "If we are to have a Navy at all it must be commensurate with these great extensions—greater in international even than in territorial importance. This necessarily involves the construction of more naval vessels, their manning, exercise and maintenance." The General Naval Board recommended the construction of four additional battleships, and the programme of 1902–3 includes two battleships, two armoured cruisers, three gun vessels (1000 tons), three gunboats (200 tons), three sloops (650 tons), three steel training ships (2000 tons), one collier (15,000 tons), and four tugs. The most noteworthy characteristics of all the vessels will be in their armament, in their under-water portions not being sheathed or coppered, and in the fact that no torpedoes will be carried—whereby space will be gained for other purposes.

Battleships. Trials.

The Illinois on her trials attained a mean speed of 17·45 knots over a 66-mile course, on June 12, 1901. The Wisconsin steamed at 15·8 knots on a two hours' natural draught run in her final trials, with 7790 I.H.P.

Maine class.

The first-class battleships Maine, Missouri, and Ohio have been launched; the Maine from Messrs. Cramp's yard, Philadelphia, on July 27; the Missouri at Newport News, on December 28; and the Ohio at the Union Works, San Francisco, on May 8, 1901. The following description is taken from the *Army and Navy Journal* of New York:—"The hull is of steel and is unsheathed. Length, 388 ft.; extreme breadth, 72 ft. 3 in. at a mean draught of 23 ft. 6 in.; displacement, 12,230 tons. The hull is protected abreast of the boilers and engines by a side armour-belt extending 3 ft. 6 in. above the load-water line and 4 ft. below it, having a thickness of 11 in. for a depth of 4 ft. 3 in., tapering to $7\frac{1}{2}$ in. at the bottom of the belt, and by the casemate armour, 6 in. thick, which extends from the side belt to the upper deck and is worked from the centre of the forward to the centre of the after barbette. At the ends of this casemate armour, diagonal armour 9 in. thick extends from the sides of the vessel to the barbette armour. In the casemate thus formed are placed ten of the 6-in. guns. Above this, on the upper deck, are four 6-in. guns, in the vicinity of which 6 in. armour is worked far enough forward and aft to afford protection to the crews of these guns. Protection is afforded to the vitals of the ship below the water-line by a protective deck, worked flat within the casemate, the total thickness on the flat being $2\frac{3}{4}$ in., while that on the slopes forward and aft is respectively 3 in. and 4 in. Coffer-dams are built on the protective deck from the diagonal armour bulkheads to the bow and

stern in the vicinity of the water-line, and on the berth deck for nearly the length of the vessel. All of these coffer-dams are filled with corn-pith cellulose. The main battery of the ship consists of four 12-in. breech-loading guns, placed in two balanced turrets, and sixteen 6-in. Q.F. guns. The turrets are turned by electricity. The armour of both the turrets and barbettes is 12 in. thick. Ten of the 6-in. guns are within the casemate, as before stated; two others are on the berth deck forward in 6-in. armoured sponsons, and four are on the upper deck. Those in the sponsons forward and two on the upper deck can fire directly ahead, and the other two on the upper deck directly astern, in addition to having a broadside fire. The secondary battery consists of six 3-in. Q.F. guns, eight 6-pdr. Q.F., six 1-pdr. Q.F., two Colts, and two 3-in. Q.F. field guns. A new feature introduced in the offensive power of this ship is the submerged torpedo tubes, one on each side of the vessel. The Ohio and her class are the first battleships of the U. S. Navy to be supplied with them. The magazines and shell rooms of the ship can stow 240 rounds of 12-in. ammunition, 3200 rounds of 6-in. ammunition, 9600 rounds of 6-pdr., and 4000 rounds of 1-pdr. The armour of the forward conning-tower is 10 in. thick, and that of the after or signal tower is 6 in. thick. A steel tube, 12 in. in diameter inside and 7 in. in thickness, extends from the forward conning-tower down to the protective deck, and protects the voice tubes and telegraphs from the commanding officer to the important stations in the vessel. Bilge keels to reduce rolling are fitted to the vessel. The normal coal supply is 1000 tons, and the capacity of the bunkers is 2000 tons. The arrangement of the bunkers is such as to afford considerable incidental protection to the machinery. Steam for the propelling machinery is supplied by water-tube boilers of the Thornycroft type placed in four water-tight compartments. There are three smoke stacks. The two propelling engines are of the vertical cylinder direct-acting triple-expansion type, having four cylinders. The collective I.H.P. of the main engines is about 16,000 when the vessel is making a speed of 18 knots."

Battle-ships.

The following is a description of the two battleships for which provision is made in the current estimates:—The full load displacement will be 17,581 tons; the length, 450 ft. at the water-line; the beam, 76 ft. 2 in.; and the maximum draught, 26 ft. 9 in. Protection will be given by a complete water-line belt, 9 ft. 3 in. wide, with a maximum thickness of 11 in. amidships for a distance of about 200 ft., forward and aft of which the extreme thickness will be 9 in. as far as the big gun turrets, from which point it will be gradually decreased to 4 in. at the stem and stern. The turrets for the big

guns will have 9 in. of armour, with 11 in. port plate, and 10 in. on the barbettes. Between these, and above the water-line belt, will be 6-in. armour with athwartships bulkheads at the extremities, above which again will be 7 in. of armour for the protection of the 7-in. guns. In the two barbettes will be four 12-in. guns in pairs, the platforms being electrically controlled and the guns having an arc of fire of 270 degrees. There will also be eight 7-in. guns in pairs in four electrically-controlled balanced turrets at the angles of the main deck, these turrets having $6\frac{1}{2}$ in. of armour. The superposed turret principle, as adopted in the Kearsarge, has thus been abandoned in these ships. The guns will fire right ahead or right astern, and on each side to 55 degrees before or abaft the beam. Twelve 7-in. Q.F. guns will be in the battery on the gun deck on pedestal mounts behind the 7-in. armour, each gun being separated from the others by traverses of $1\frac{1}{2}$ in. to 2 in. thickness, and the forward and after guns will fire right ahead or right astern. It will be seen that the belt and casemate armour combine with the gun turrets to form a very strong citadel, outside of which there will be excellent protection for the extremities of the ship. Amidships, the armoured deck will be flat between the turrets at a height of 3 ft. above the water-line, but forward and aft it will slope to the bottom of the side armour, the extreme thickness being $4\frac{1}{2}$ in. at these points. The minor armament comprises twenty-two 3-in. Q.F., eight 1-pdr., and six machine guns. The magazines and shell rooms will be so arranged that about one-half of the ammunition will be carried at the ends of the ships, while sufficient refrigerating apparatus will be provided for those amidships. The ammunition hoists will be worked electrically. The propelling machinery will consist of two triple-expansion engines of 20,000 I.H.P., with water-tube boilers. The estimated speed is 19 knots. The bunker capacity will be 2300 tons.

Including the battleships mentioned—the three vessels of the Maine class, and the five of the New Jersey class—there will be under construction for the United States Navy during the present year no less than ten first-class battleships; a larger number than that for any other navy, excluding our own.

The monitor Florida, of 3235 tons displacement, launched at Messrs. Nixon's yard, Elizabeth Port, Bath, on November 27, is a sister ship to the Arkansas, Nevada, and Wyoming, launched in 1900. The estimated speed with 2400 I.H.P. is 11·5 knots. Monitors.

The monitors Manhattan, Catskill, and Mahopac, built during the Civil War, are to be sold.

Six armoured cruisers, of 13,680 tons displacement and 22 knots speed with natural draught, are under construction:—The West Armoured cruisers.

Virginia and Maryland, at Newport News; the Pennsylvania (laid down in August, 1901) and Colorado, at Messrs. Cramp's yard, Philadelphia; the California and South Dakota, at the Union Ironworks. The Drake class have a slight advantage over the California type in speed and radius of action.

Three armoured cruisers, of 9700 tons displacement, which were described in the *Naval Annual* of 1901 (p. 62), are under construction—the Charleston at Newport News, the St. Louis at Messrs. Neafie & Levy's yard, Philadelphia, and the Milwaukee at the Union Ironworks, San Francisco.

Cruisers projected.

The principal dimensions and data of the two armoured cruisers projected for 1902 are as follows:—Length on water-line, 502 ft.; breadth, 72 ft. 8 in.; trial displacement, 14,500 tons; coal capacity, normal, 900 tons; maximum displacement at full load, about 15,959 tons; maximum draught, corresponding to maximum displacement, about 27 ft. 2 in.; total bunker capacity, about 2000 tons. On trial displacement the vessel will carry, in addition to the complete hull machinery and armament, 900 tons of coal, two-thirds full supply of ammunition, two-thirds full supply of stores and provisions, full complement, and 66 tons of reserve feed water. The armament comprises four 10-in. guns, sixteen 6-in. Q.F., twenty-two 3-in., twelve 3-pdr., four 1-pdr., and six machine guns. The propelling machinery comprises two main engines, each in a separate water-tight compartment, and 16 water-tube boilers, in eight water-tight compartments. The speed obtained on trial will be not less than 22 knots per hour. The main engines are the four-cylinder triple-expansion type, giving at 120 revolutions per minute, maximum, the combined I.H.P. of 25,000.

Cleveland.

The protected cruiser Cleveland, of 3200 tons, laid down in May, 1900, was launched on September 20, 1901, at the Bath Ironworks. Five others of the same type are under construction. They were described in the *Naval Annual* of 1900 (p. 48). The estimated speed is 16·5 knots with 4700 I.H.P.

Destroyers.

Sixteen destroyers were provided for in the estimates of 1898. The Truxton, Whipple, and Worden, of 433 tons displacement, 8300 I.H.P., and 30 knots speed, were launched on August 15 by the Maryland Steel Company, Baltimore. The Bainbridge, 420 tons displacement, 8000 I.H.P., 29 knots speed, was launched at Messrs. Neafie & Levy's yard on August 17. The Chauncey, sister ship to the above, has also been launched. The Goldsborough, built at Portland, Oregon, has given much trouble on her trials.

Torpedo boats.

The Bagley and Barney, of 167 tons displacement, attained a speed of 29·2 knots and 29·3 knots on their trials, instead of the 28 knots estimated.

The Tingey was launched in April, 1891; the Wilkes on September 28.

A very unfavourable report upon the torpedo craft has been presented by a special Board appointed to inquire into the complaints of the contractors, who claim relief on the ground that they should not be held responsible for failures under the Navy Department's designs, that the price of materials has greatly increased, and that the cost has been augmented by the expense of repeated trials resulting in many failures. The destroyers Truxton, Whipple, and Worden, designed by the Maryland Steel Company, have given good results, and the torpedo boats Bagley, Barney, and Biddle, designed by the Bath Ironworks Co. after studying the plans of M. Normand at Havre, may prove satisfactory. The Department has accepted the Shubrick and Stockton, built at Richmond from its own designs, but, up to the present time, of the 16 destroyers and 12 torpedo boats of the programme only five have been taken over. None of the destroyers are expected to be fully satisfactory. They are not sufficiently strengthened against wave-actions and vibrations, and will not attain the desired speed, though to speed much has been sacrificed. Of the torpedo boats the Bailey, Stringham, Blakeley, De Long, Nicholson, and O'Brien, and probably others, are defective in speed or otherwise unsatisfactory. Report on torpedo craft.

The first of the new type of submarines, the Adder, was launched at Elizabeth Port on July 22; displacement submerged, 120 tons. The speed on the surface is to be eight knots, the motive power being a gasoline engine of 160 I.H.P.; and submerged, seven knots, the motive power being an electric motor of 75 I.H.P. The radius of action is 400 miles. She is fitted with one torpedo tube in the stem. The Shark was launched on October 19, and the Moccassin and Porpoise are also in the water. Two others of the same type are under construction. The trials of the Fulton, an experimental boat built by the Holland Company and launched in June, 1901, are dealt with elsewhere. Submarines.

The large increase to the fleet demands a corresponding increase in the number of officers and men. The Secretary of the Navy, in his report, gives two interesting tables (see next page) comparing the United States *personnel* with that of the other principal naval powers. *Personnel.*

The numbers on the United States Navy Lists, including the former engineer officers (165 in 1900 and 155 in 1901), are: 1896, 715; 1897, 712; 1898, 712; 1899, 704; 1900, 717; 1901, 728.

The Secretary of the Navy recommends that the number of lieutenants be increased from 300 to 350, that the number of junior

lieutenants and ensigns be raised to 600, that the enlisted force be increased by 3000 men and the marine corps by 750 men, and presses for the establishment of a national naval reserve (as distinguished from the naval militia, who are essential for coast defence) from which to draw for sea service on the outbreak of war, or when war is imminent.

TABLE I.—Number of Commissioned Officers of the Executive Branch.

Nation.	1896.	1897.	1898.	1899.	1900.	1901.
England	1728	1768	1804	1897	1970	2085
France	1612	1707	1695	1662	1663	1663
Germany	723	749	785	826	905	974
Russia	859	1089	1002	1023	1096	1096
Japan	...	...	619	700	724	...
Italy	586	586	720	748	768	...

TABLE II.—Total Strength of all Ranks and Ratings.

Nation.	1895.	1896.	1897.	1898.	1899.	1900.
England	88,500	93,750	100,050	106,390	110,640	114,880
France	...	45,113	45,461	48,783	44,620	49,775
Germany	21,487	21,485	23,302	24,906	26,651	30,386
Russia*	40,372	40,500	40,184	42,500	39,546	39,546
Japan*	13,839	23,000	23,000	23,000	23,000	26,108
Italy	24,203	24,200	24,200	25,669	24,560	25,804
U.S.	13,460	13,460	13,218	12,218	20,275	23,453

In the above table the English figures include the Royal Marines. The French marine infantry is not included. The United States figures do not include marines.

JAPAN.

The Mikasa, the last of the six first-class battleships which have been built in England since 1896, was sent from Barrow to Portsmouth in December to be docked, previous to her trials. On the six hours' trial, at four-fifths power, she steamed 17·3 knots with 12,235 I.H.P. and a coal consumption of 1·53 lbs., the guaranteed coal consumption being 2 lbs. This result, as pointed out in the *Engineer*, has only been surpassed in recent years by one British battleship—the Vengeance—which was also built by Messrs. Vickers, Sons & Maxim, and the coal consumption of which, on her 30 hours' trial, was 1·51 lbs. The 25 Belleville boilers were worked entirely by Japanese stokers. On the full-power trial the Mikasa steamed 18·6 knots, with 16,400 I.H.P., as against an estimated speed

* The figures given in the table differ considerably from those given elsewhere.

of 18 knots with 15,000 I.H.P. Progressive speed trials were made at the lower powers on the measured mile at Stokes Bay, and at the higher powers on a deep-sea 10-mile course off the coast of Devon. The results were as follows :—

At 10 knots	2000 I.H.P.
" 12 "	3450 "
" 14 "	5500 "
" 16 "	8500 "
" 18·54 "	16,100 "

Cruisers.

Two third-class cruisers have been laid down from the designs of Mr. Satow, the Chief Constructor of the Japanese Navy, the Niitaka at Yokosuka, the Tsushima at Kure. Displacement, 3420 tons; length, 334 ft.; beam, 44 ft.; draught, 16 ft. 6 in; I.H.P., 9400; speed, 20 knots; Niclausse boilers. The armament compares favourably with that of other cruisers of about the same size. It comprises six 6-in. guns mounted so that three fire ahead and three astern, ten 3-in., and four $2\frac{1}{2}$-pdr. Q.F. guns. The protective deck has a thickness on the slopes of $2\frac{1}{2}$ in. The maximum coal capacity is 600 tons. These cruisers will be built of steel, with ram bow and full stern, without overhang; will have double bottoms throughout the space between the masts, and will have two signal masts and three funnels.

The Yayeyama, 1600 tons, built in Japan in 1889, is to receive Niclausse boilers.

Destroyers.

The Akatsuki was launched by Messrs. Yarrow, at Poplar, on November 13, 1901, and went through her official trials on November 20. The mean of six runs on the measured mile gave a speed of 31·3 knots. The mean speed for three hours was 31·121 knots; revolutions, 404; I.H.P., 6450; coal consumption, 1·97 lbs.

The Shirakumo was laid down at Chiswick on February 28, 1901; was launched on October 1, and went through her trials early in January, 1902, in boisterous weather. The mean speed of six runs on the measured mile was 31·819 knots with 400·8 revolutions. The mean speed for the whole trial was 31·030 knots. The Asashio, sister ship to the Shirakumo, was launched at Chiswick in 1902. The Kasumi, built by Messrs. Yarrow, attained a speed of 31·075 knots on the measured mile, and 31·295 for three hours.

Four destroyers—the Harusame, Hayatori, Asagiri, and Muvasame—are building at Yokosuka, and six torpedo boats (152 tons)—the Kari, Awataka, Hato, Tsubamo, Hibari, and Kiji—at Kure. Nos. 60 and 61 (83 tons) were launched at the Kawasaki works, Kobe, in June, 1901, the materials having been sent out by Schichau.

It is stated that the torpedo boats Sagi, Uzuri, and Kamone will be put in hand at Kure, and the Hashitaka and Otori at Kawasaki.

The *personnel* in 1900 consisted of 2027 officers and 21,815 men. The Navy undertake all floating defences, including submarine mines.

MINOR NAVIES.

Austria.

The ordinary estimates for 1902 amount to £1,283,470; the extraordinary estimates to £661,980; or a total of £1,945,450.

Battle-ships.

Three battleships, of 8300 tons, are under construction. The Habsburg was launched in 1900 and the Arpád in September, 1901, at Trieste, while the Babenberg was laid down last year. Particulars of their armament and protection were given in the *Naval Annual* of 1901. The normal coal capacity is 840 tons, and the radius of action will be 3600 miles at 12 knots.

Battle-ships laid down.

Two battleships, A and B, to replace the Laudon and Drache, have been laid down. Displacement, 10,600 tons; length, 390 ft. 6 in.; beam, 72 ft. 3 in.; draught, 24 ft. 6 in. The estimated speed is 19 knots, with 14,000 I.H.P. The boilers will be of the Yarrow type. The armour-belt extends from turret to turret and has a maximum thickness of 8·2 in. Above the belt the side is protected by 5-in. armour to the height of the main deck. Amidships this armour is carried up to the level of the upper deck, forming a redoubt for the eight 7·5-in. Q.F. guns. The deck has a thickness of 2 in. The armament comprises four 9·4-in. guns, mounted in pairs in turrets forward and aft and protected by 9·4-in. armour, the eight 7·5-in. Q.F. guns already mentioned, six 6-in. Q.F. guns mounted on the upper deck in casemates above the spaces between 7·5-in. guns, and 28 smaller Q.F. guns. These battleships, therefore, carry a powerful secondary armament. They have a large area of armoured side and a good speed on a displacement of only 10,600 tons. The second vote for A and the first for B are in the Budget of 1902.

Cruisers.

The armoured cruiser E, to replace the Radetzky, has been laid down. Displacement, 7400 tons; length, 384 ft.; beam, 61 ft. 8 in.; draught, 21 ft. 4 in. The estimated speed is 21 knots with 12,300 I.H.P. E more resembles a small battleship than a cruiser. She is protected by a belt extending from turret to turret, of which the maximum thickness is 8·2 in., tapering to 6½ in. at the lower edge, and by thinner armour to the height of the main

deck. In the forward turret, which is protected by 8·2-in. armour, two 9·4-in. guns are mounted. In the after turret, which is protected by $5\frac{1}{4}$-in. armour, only one 7·5-in. gun is mounted. Four 7·5-in. guns are mounted on the main deck amidships, two on each side in a casemate which is divided by a bulkhead. Four 5·9-in. Q.F. guns are mounted in casemates also on the main deck. These casemates are placed abreast of the forward and after turrets. The arrangement appears an ingenious economy of armour, for the casemates themselves both protect the turret bases and ammunition hoists of the principal guns, and serve as thwartship-bulkheads to protect the ship from a raking fire.

The torpedo cruiser Szigètvár, of 2350 tons displacement, launched at Pola in 1899, replaces the old Fasana, and is a sister of the Aspern and Zenta. Szigètvár

Two monitors for the Danube and five patrol boats are to be begun in 1902. Danube flotilla.

Argentine Republic.

The Argentine Republic has for some time ceased to expend money on new construction. Some of the most remarkable cruisers of their day, the Esmeralda and the Buenos Ayres (the latter with a speed of 24 knots), were built at Elswick for the South American Republics, and the Argentine Republic possesses a powerful squadron in the four armoured cruisers of the Garibaldi type recently built in Italy. Two armoured cruisers of 8500 tons displacement, 17,000 I.H.P., and 21 knots speed—the General Mitra and General Roca—have just been ordered from Messrs. Ansaldo at Sestri Ponente. The monitors El Plata and Los Andes, of 1535 tons, have been refitted. Five armoured vessels, four cruisers, and four destroyers of the Argentine Navy took part in manœuvres at Bahia Blanca, described as the most important ever held in South American waters.

Chili.

The cruiser Chacabuco, of 4500 tons displacement and 22·5 knots speed, has been bought from Elswick. The armament comprises two 7·8-in., ten 4·7 Q.F., and sixteen smaller guns. There are four torpedo tubes, two being submerged. At the same time two 30-knot destroyers were purchased from Messrs. Laird, of Birkenhead.

Two battleships of 12,000 tons have been ordered from Messrs. Armstrong, Whitworth & Co., and from Messrs. Vickers, Sons & Maxim.

Denmark.

The Navy Estimates for 1901–2 amount to 6,796,495 crowns (£373,400), or about the same as the previous year. The shipbuilding vote amounts to £66,700, and provides for carrying forward a sister ship to the Herluf Trolle, named the Olfert Fischer, of 3500 tons displacement, and the reconstruction of some smaller vessels.

The gunboat Möen, of 356 tons displacement, launched in 1875, sank during some experimental firing with high explosives, fortunately without loss of life.

Greece.

Three cruisers, four destroyers, and six torpedo boats are reported to have been ordered from Italian firms—viz., Messrs. Ansaldo, of Sestri; Odero, of Genoa; Orlando, of Leghorn; and Pattison, of Naples. The latter will build one cruiser, one destroyer, and four torpedo boats.

Mexico.

Two gun-vessels have been laid down for the Mexican Government at the Crescent Shipbuilding Company's yard at Elizabeth Port, New Jersey. Displacement, 1000 tons; length, 200 ft.; beam, 33 ft.; draught, 10 ft. Armament: four 4-in. and six 6-pdr. Q.F. guns, and a bow torpedo tube; speed, 16 knots; coal endurance, 7000 miles. The vessels are fitted to carry 200 soldiers in addition to the regular crew.

Netherlands.

The Navy Estimates for 1902 amount to a total of £1,390,766. The sum allotted to new construction is £315,250, which includes the completion of the small battleships De Ruyter and Hertog Henrick, of 4950 tons displacement.

The torpedo boats Ruidjani and Pangrango, built by Messrs. Yarrow, attained a speed of 25·59 knots and 25·99 knots respectively on their trials.

The experiments made with oil fuel in the Ophir, also built by Messrs. Yarrow, were successful. The speed obtained with coal only was 24½ knots, but with coal and oil together 26½ knots.

The object in view is to supplement the coal fuel in case of an emergency by oil, by which, within a few minutes, the maximum speed may be obtained, although the coal fire may not be in good condition. This is a plan which deserves special consideration. It

does not involve all the difficulties incidental to regulating the burning of oil fuel, but enables, for a spurt, the maximum speed to be obtained at any time.

Norway.

The Budget for 1902 amounts to £22,200 (4,009,000 crowns). The sum appropriated to new construction has been reduced from £44,000 in 1901 to £14,000 in 1902, and will be spent on two second-class torpedo boats and a despatch vessel of 850 tons.

A coast-defence armour-clad of the Eidsvold class is in hand at Elswick.

Portugal.

The cruiser Rainha Amelia, of 1660 tons displacement, designed by the French naval constructor, M. Croneau, on her natural draught trial, which lasted for five hours, attained a speed of 17·1 knots with 3088 I.H.P., and on the three hours' forced draught trial a speed of 20·6 knots with 5396 I.H.P.

The old ironclad Vasco da Gama, built at Blackwall in 1876, is being reconstructed by Messrs. Orlando, of Leghorn. She is to be lengthened 23 ft. amidships.

The torpedo gunboat Tejo, of 530 tons displacement, was launched on October 27 in the presence of the King. The estimated speed is 25 knots with 7000 I.H.P. The armament consists of one 3-in. and six 1·8-in. Q.F. guns, and three torpedo tubes. The hull is of hardened nickel steel. The complement will be five officers and 80 men.

Roumania.

It is reported that Roumania intends to build eight monitors of 500 tons, 12 torpedo boats, and eight vedettes for the Danube, besides six coast-defence vessels of 3500 tons, four destroyers of 300 tons, and 12 torpedo boats.

Spain.

The chief feature of Spanish shipbuilding is the length of time during which ships remain under construction. The armoured cruisers Cardenal Cisneros, Princesa de Asturias, and Cataluña are of the Infanta Maria Teresa class. The Infanta Maria Teresa herself was launched in 1891, and she and two of her sister ships were destroyed in the Spanish-American war. Their design was inspired

by the belted cruisers of our Orlando class, so that when the Cardenal Cisneros, Princesa de Asturias, and Cataluña are completed they will already be somewhat out of date. The two former will probably be completed during 1902. The Cataluña may possibly be completed in 1903. Displacement, 7000 tons; speed, 20 knots.

Reina Regente. The second-class cruiser Reina Regente, building at Ferrol, is of 5372 tons displacement. The estimated speed is 20 knots with 6500 I.H.P. The protective deck has a maximum thickness of 3 in. The armament comprises ten 5·5-in. and 12 2·2-in. Q.F. guns. £115,000 is, according to the *Naval Mundo Illustrado*, to be spent in advancing this vessel in 1902.

Estremadura. The cruiser Estremadura, of 2030 tons displacement, which is being built from patriotic subscriptions, will be completed in 1902. The armament, which includes eight 4-in., four 2·2-in., two 1.4-in., and two 3-in. landing guns, will be supplied by Messrs. Vickers, Sons & Maxim.

The Mole at Cartagena will be practically completed during 1902, and £90,000 is to be spent at Caracca.

The *Revista General de Marina* published in February, 1902, a decree signed by the Queen Regent, constituting a committee to report as soon as possible upon the proper constitution of the national squadron, indicating the types of vessels and the approximate cost, also whether it would be advantageous to construct the ships in Spanish yards or purchase them abroad. The Government will then submit to the Cortes a proposal for building such ships as are considered necessary for national defence. The Duke of Veragua, Minister of Marine, presides over the committee, which consists of the admiral and vice-admiral, who are vice-presidents of the consultative naval committee, a rear-admiral, three captains, the inspectors of engineering and ordnance, a senator, a deputy of the Cortes, a representative of private shipbuilding industry, and a representative of the mercantile marine.

Sweden.

In the Budget for 1902 the ordinary charges amount to £581,000, and the extraordinary charges to £610,000, or together about the same as last year.

Battleships. Including ships under construction, Sweden will shortly possess a fleet of ten small battleships of from 3000 to 3700 tons displacement, the earliest of which, the Svea, was launched in 1886. They are well protected, and carry a fair armament for their size. They are of light draught, and the coal supply does not exceed 300 tons, being

designed especially for service in Swedish waters. The Svea, Göta and Thule are being modernized, their guns being converted to quick-firers.

Dristigheten. The Dristigheten, which was launched in 1900, attained a speed of 17 knots on her preliminary trials. She is fitted with Yarrow water-tube boilers; I.H.P., 5400. Protection is afforded by an 8-in. belt of armour. The armament includes two 8·2-in. guns, mounted in turrets forward and aft, and protected by 8-in. armour; six 5·9-in. Q.F. guns, mounted in an armoured redoubt on the upper deck, and ten 2·2-in. guns.

Three coast-defence battleships of the same type, slightly modified, are under construction—the Wasa, Aeran, and Tapperheten; and a fourth, the Manligheten, has been ordered from the Kockum Company, at Malmö. The first-named was launched in 1901. The displacement is increased from 3500 to 3670 tons, and the coal capacity from 300 to 370 tons. The thickness of the belt armour is reduced from 8 to 7 in. The armament is the same as that of the Dristigheten. The speed is to be 16·5 knots with 5500 I.H.P.

Destroyer. A 31-knot destroyer has been ordered of Messrs. Yarrow, of Poplar, and has received the name of Mode.

Proposed cruiser. The *Engineer* published in April, 1901, the following particulars of the design of a proposed cruiser:—"Displacement, 4000 tons; length, 328 ft.; beam, 50 ft.; draught, 17 ft.; armament includes eight 6-in. and twelve 6-pdr. Q.F. (Bofors) guns, and two submerged tubes (Elswick). Protection is afforded by a double turtle-back deck and complete cellulose belt rising 3 ft. above the water-line. The armour on the turrets will be 4–5 in., with armoured hoists to each. Speed, 22 knots, and boilers Yarrow. The ship can fire six of her eight 6-in. pieces on the broadside. Each gun is in a closed turret, and each turret is balanced and revolves on its armoured hoist."

It has been decided to build a vessel for coastguard service, to be equipped for ice-breaking, towing, and wrecking purposes. Her dimensions are:—Length, 131 ft.; beam, 25 ft.; draught, forward 8 ft., aft 10 ft.; displacement, 300 tons. With 500 I.H.P. the speed is to be 12·5 knots. The armament is to consist of two 6-pdrs. forward and one of the same calibre aft.

Turkey.

Since the war with Greece the navy has occupied a good deal of attention in Turkey, but owing to financial difficulties not much progress has yet been made in the direction of making it efficient. The reconstruction of the Messoudieh, a sister ship to our Superb, at Messrs. Ansaldo's yard, Genoa, has at last been completed. She

was built at the Thames Ironworks in 1874, and the present writer was assured, when he visited the ship shortly after her arrival at Genoa, that her hull was still in excellent condition—a fact which reflects great credit upon her builders.

Messoudieh. The original armament of the Messoudieh was twelve 10-in. M.L. guns, in a central battery, and one 7-in. M.L., mounted right in the bows. The present armament, which is supplied by Messrs. Vickers, includes two 9·2-in. guns, mounted in turrets on the upper deck, protected by 6-in. armour; twelve 6-in. Q.F. guns, mounted in the central battery on the main deck; fourteen 3-in. Q.F., distributed on the upper deck; and ten 2·2-in. guns on the superstructure. Twin screws have been fitted instead of a single propeller. The machinery consists of two four-cylinder triple-expansion engines, to which steam is furnished by 16 Niclausse water-tube boilers. The estimated speed is 15 knots with 11,000 I.H.P.

No progress has apparently yet been made with the reconstruction of the Assar-i-Tewfik, launched at La Seyne in 1868. She is a central battery ship of 4687 tons displacement. She was sent to Genoa at the same time as the Messoudieh, and was subsequently sent on to Kiel.

Cruisers. A cruiser of 3250 tons displacement has been ordered of Messrs. Armstrong, Whitworth & Co. She is the first warship ordered in England by the Turkish Government for 25 years. A sister ship has been laid down at Messrs. Cramp's yard, Philadelphia. She is thus described in the United States official *Information from Abroad*, July, 1901:—

"Her dimensions are to be as follows:—Length on water-line, 340 ft.; beam, 42 ft.; draught, 16 ft.; displacement, 3250 tons. She will have two masts, fitted with military tops and signal yards, four search-lights, and the usual protective deck. The armament will consist of two 6-in. Q.F. guns, one forward and one aft on the upper deck in the middle line of the ship, protected by armoured shields; eight 4·7-in. Q.F. guns, four on each broadside, with armoured shields; six 3-pdr. Q.F. guns, and six 1-pdr. machine guns, all fitted with shields. She will be equipped with two triple-expansion engines and with Niclausse water-tube boilers, and is expected to develop 12,000 I.H.P. and to make a speed of 22 knots."

Torpedo boats. Two sea-going torpedo boats have been completed by Messrs. Ansaldo. The estimated speed is 27·5 knots. During the trials in a rough sea, a speed of 26 knots was maintained for seven miles. The delivery has been delayed owing to the non-payment of the final instalment of the purchase-money.

T. A. Brassey.
John Leyland.

CHAPTER III.

Comparative Strength.

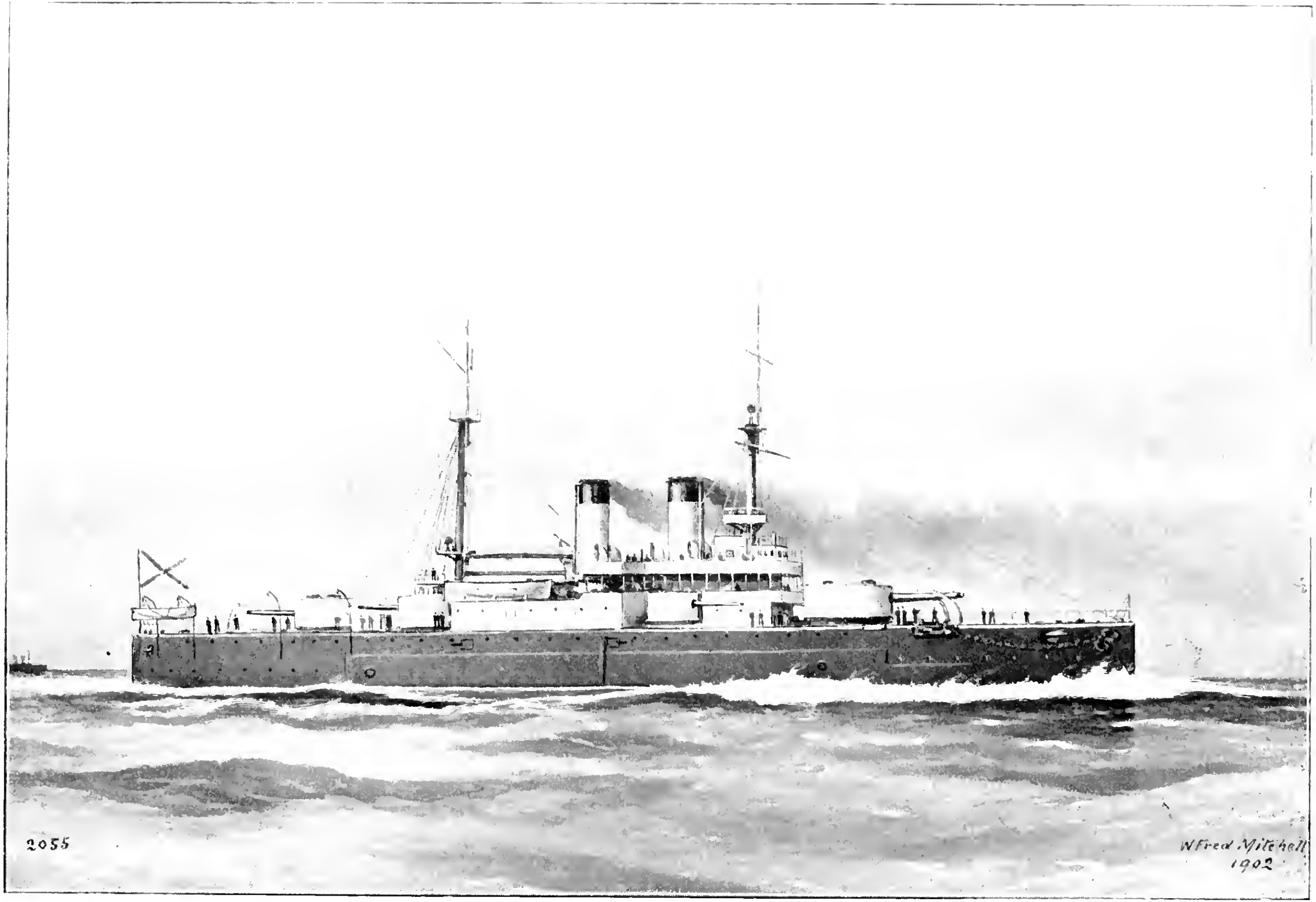
Dealing first with ships in commission, there have been very considerable changes in the distribution of naval strength during the past twelve months. European Waters.

In the Mediterranean Squadron the ships of the Royal Sovereign class are being gradually replaced by the Formidable class. The Bulwark will shortly relieve the Renown; while the Devastation has been relieved as port-guardship at Gibraltar by the Irresistible. The Channel Squadron, temporarily reduced to seven, will again consist of eight battleships as soon as the London is completed. On the other hand, the Reserve Squadron has been strengthened by the substitution of the Resolution, Revenge, and Empress of India for the Alexandra, Colossus, and Rodney. The Reserve Squadron now assembles for a cruise three times during the year. The cruiser strength of the Mediterranean Squadron, which was lamentably weak last year, has been improved by the return to their proper stations of the Astraea from China and the Naiad from the Cape, and by the addition of some cruisers of the Pelorus class—which appear to be especially suitable for employment on this station—but still leaves something to be desired. In considering our cruiser strength in European waters, the cruiser squadron, which has been substituted for the training squadron, and which consists of one first-class and five second-class cruisers, must be taken into account. For two of the latter, first-class armoured cruisers are to be substituted during the current year. Great Britain.

The French Mediterranean Fleet comprises in the Permanent Squadron six battleships, as compared with seven last year, and in the Reserve Squadron five ships (including the Magenta, which is at Toulon, not attached to the squadron), as compared with two. There has thus been a considerable increase in French naval strength in the Mediterranean. On the other hand, the French Northern Squadron comprises only three ships, as compared with six, the Baudin, Carnot, and Hoche having been transferred to the Mediterranean, where they form the Reserve Division with the Amiral Charner. The Bouvines, Tréhouart, Jemmapes, and Valmy form a reserve squadron in the Channel. The coast-defence ships, Indompt- France.

Class.	Great Britain: Mediterranean Fleet.	Great Britain: Channel Fleet †	Great Britain: Reserve Squadron.	France: Mediterranean Fleet: Permanent Squadron.	France: Mediterranean Fleet: Reserve Ships.	France: Northern Squadron.	Russia: Mediterranean.	Russia: Atlantic.
Battleships	Bulwark Cæsar Canopus Formidable Hood Illustrious Implacable Irresistible* Ramillies Royal Oak Royal Sovereign Victorious	Hannibal Jupiter Magnificent Majestic Mars Prince George Repulse	Emp. of India Resolution Revenge Anson Benbow Camperdown Collingwood Sans Pareil Nile Trafalgar	Bouvet‡ Charlemagne Charles Martel Gaulois‡ Jauréguiberry Saint Louis	Brennus Carnot‡ Admiral Baudin Hoche‡ Magen'a (Toulon)	Masséna Courbet Formidable Bouvines Tréhouart Jemmapes Valmy	Nicolas I.	..
Coast-Defence Ships	Rupert Orion	..	Conqueror Hero	Indomptable (Toulon) Tempête and Phlégéton (Bizerta)	..	Styx and Requin (Cherbourg)	..	..
Cruisers, 1st Class	Andromeda Theseus	Diadem Niobe	Australia Galatea	Pothuau Chanzy Latouche-Tréville	..	Dupuy-de-Lôme Bruix	..	..
Cruisers, 2nd Class	Diana Gladiator Vindictive Naiad Astraea	Arrogant Furious	Melampus Severn	Cassard Du Chayla	..	D'Assas	..	Gerzog Edinburgski
Cruisers, 3rd Class	Barham Pandora Pegasus Pioneer Pyramus Scout	..	..	Lavoisier Linois Galilée	..	..	*Gunboats*— Teretz Khrabry	Kreizer
Torpedo Depôt Ship	Vulcan	..	..	Foudre	..	..	..	..
Torpedo-Gunboats	3	..	..	Condor Flèche	Lévrier (Corsica)	Cassini Lance (Lorient) Salve (Brest S^te Barbe (Dunkirk)	1	..
Destroyers	21	..	‖	5	1	3	2	..

* Port-Guardship, Gibraltar. † London to be added. ‡ The Hoche and Carnot have taken the place of the Bouvet and Gaulois in the Permanent Squadron while the latter are in dockyard hands.
‖ Instructional Flotillas of varying numbers.



RUSSIAN BATTLESHIP "ROSTISLAV."

able, Tempête, and Requin, are in commission as port-guardships at Toulon, Bizerta, and Cherbourg respectively. Ships in commission for trial, such as the Henri IV. at Cherbourg, Iéna at Brest, Jeanne d'Arc and Montcalm at Toulon, are not included in the figures given above.

In European waters we have 29 battleships in commission, 22 of which are of the first class and seven of the second class. The French have 18 battleships in commission, of which nine are of the first class and five of the second class, and four—viz., the Bouvines, Tréhouart, Jemmapes, and Valmy—of the third class.

The Russians have one battleship (the Nicolas I.) in commission in the Mediterranean, besides three gunboats. The Gertzog Edinburgski and Kreizer are cruising in the Atlantic. Russia.

The Italians have in the Mediterranean, in full commission for seven months and with reduced crews for five months, five first-class, two second-class, and one third-class battleships, four armoured cruisers, besides smaller vessels. Italy.

The Russian squadron in the Baltic, appointed this year for "gunnery practice," will consist of the Alexander II., General Admiral Apraxine, Admiral Oushakoff, Admiral Grieg, Admiral Lazareff, Pervenetz, Kreml, and the armoured cruiser Pamyat Azova, with gunboats, &c.; and the General Admiral, Kniaz Pojarski, and other vessels will be in commission for cadets. Baltic. Russia.

The German squadron in the Baltic will be increased in strength, and will comprise the five battleships of the Kaiser class; the Brandenburg, Weissenburg, Baden, and Württemberg; the armoured cruiser Prinz Heinrich, and other cruising vessels. The Hildebrand, Heimdall, Hagen, and Beowulf will form a reserve division. Germany.

Owing to the cessation of hostilities in China, the naval strength of some Powers has been reduced. The four German battleships have returned to home waters. The Russian Sissoi Veliky has been replaced by the Peresviet. The battleship Retvizan is expected to go out in June, and probably the Pobieda later in the year. From May to August it is announced that the new cruisers Novik, Bogatyr, Askold, Diana, and Boyarin will proceed to the Far East, probably followed by the Pallada in the autumn. The French cruisers Amiral Charner and Guichen have been sent home, the latter being replaced by the d'Entrecasteaux. The British squadron now comprises four battleships of the useful Canopus class, one of which and the Cressy have replaced the Barfleur and Centurion. The Arethusa and Astraea, which were temporarily attached to it, have returned to their own stations, the former to the Pacific, the latter to the Mediterranean. We still appear to maintain an inordinate number of Naval strength in Far East.

small sloops and gunboats on the China station, some of which, if not built for river work, might be dispensed with.

Japanese alliance. The naval situation in the Far East has been profoundly modified by the Anglo-Japanese alliance, which obliges each country to assist the other in the event of war with more than one Power over questions arising out of the situation in China and Corea. Japan possesses six first-class battleships and six first-class armoured cruisers, besides a number of high-speed second-class cruisers, most of which were built at Elswick. Japan is by no means to be despised as a naval Power, but the advantage to be derived from this alliance is probably greater for Japan than for ourselves. It should, however, permit of some reduction in the strength of the squadron which we have lately maintained in the Far East.

Other stations. The squadrons on the East Indian, Cape, North American, Australian, and Pacific stations remain about the same as last year. It was suggested by Lord Brassey, in a letter to the *Times* in September last, that a reduction in the number of the smaller ships on these stations was desirable. The future composition of the Australian squadron will be discussed, no doubt, with Colonial representatives at the Coronation. For employment on this station especially, cruisers of the Dido class are more suitable than third-class cruisers of the Pearl and Ringarooma type. The First Lord states in his Memorandum that the Pacific and South American squadrons are to be reduced to three cruisers and one sloop, and one cruiser and one sloop, respectively. The North American, Cape, China and East Indian squadrons are, he says, no more than sufficient for the duties which they have to perform.

Relative strength. During the past ten years the comparative strength of the leading navies of the world has been completely modified. Ten years ago the only navy which could bear any comparison with our own was that of France. Next to France as a naval Power came Russia, and then Italy. Germany and the United States were almost negligible quantities. The Japanese had not yet begun to create a navy. In former years it was customary in this chapter to estimate the comparative strength of navies by the number of battleships built and building, and especially of battleships of the first class. This method would still lead to a fairly accurate conclusion; but the modern armoured cruiser so closely approaches many modern battleships in displacement and defensive qualities, while the slight inferiority in offensive power is compensated for by a superiority in speed, that this important class should be taken into consideration.

In the period referred to we have more than held our own as regards France. France and Italy have dropped back relatively

SHIPS IN COMMISSION.

EASTERN ASIA.

CLASS.	BRITISH.	FRENCH.	RUSSIAN.	GERMAN.	UNITED STATES.
BATTLESHIPS	Albion Glory Goliath Ocean	Redoutable	Petropavlovsk Poltava Sevastopol Peresviet	..	Kentucky *Monitors*— Monadnock Monterey
1st-Cl. CRUISERS	Argonaut Blenheim Endymion Terrible Cressy	D'Entrecasteaux	Gromoboi Rurik Rossia Ad. Nahimoff Varyag	Fürst Bismarck Kaiserin Augusta	New York Brooklyn
2nd-Cl. CRUISERS	Aurora Eclipse Orlando Talbot Pique	Bugeaud Friant Pascal Chasseloup-Laubat	..	Hansa Hertha	New Orleans
3rd-Cl. CRUISERS	..	Surcouf	Razboynik Zabiyaka	Bussard Geier Seeadler Schwalbe Thetis†	Yorktown
ARMOURED GUNBOATS	..	Acheron Styx	Gremiastchy Otvazny	..	..
SLOOPS and GUNBOATS.	11*	6	3	4*	20‡
TORPEDO-GUNBOATS	..	..	3	..	..
DESTROYERS	6	1	5	1	..

* Excluding river gunboats.
† The Gazelle to be added.
‡ Including 17 in the Philippines.

SHIPS IN COMMISSION.

EAST INDIES.

Class.	British.	French.
2nd-Cl. Cruisers . . .	Highflyer Fox	Catinat
3rd-Cl. Cruisers . . .	Cossack Perseus Pomone	Infernet
Sloops and Gunboats . .	2	2
Torpedo-Gunboats . .	2 (1 *in reserve*)	..
Coast-Defence Ships . .	Magdala Abyssinia (*in reserve*)	..

ATLANTIC.

Class.	British.		French.	United States.
	Cape.	America.		
Battleships . .	Monarch	..	..	Kearsarge Alabama Indiana Massachusetts Iowa (South Atlantic)
Coast-Defence Ship	..	Hotspur	..	
1st-Cl. Cruisers .	Gibraltar	Crescent	Tage	..
2nd-Cl. Cruisers .	Forte Terpsichore	Charybdis Indefatigable Cambrian Tribune	Descartes	Atalanta (South Atlantic)
3rd-Cl. Cruisers .	Barracouta Blanche Pearl Pallas Pysche	..	D'Estrées Suchet*	..
Sloops and Gunboats . .	6	3	1	2
Destroyers. . .	..	2	..	..

* To be relieved by Davout.

SHIPS IN COMMISSION.

PACIFIC.

CLASS.	BRITISH.		RUSSIAN.
	AUSTRALIAN STATION.	PACIFIC STATION.	
BATTLESHIP . .	..	..	Navarin
1st-Cl. CRUISERS .	Royal Arthur	Grafton	..
2nd-Cl. CRUISERS .	..	Amphion Arethusa Phaeton	..
3rd-Cl. CRUISERS .	Katoomba Mildura Ringarooma Wallaroo Phœbe Archer	..	Ad. Korniloff
SLOOPS and GUN-BOATS	4	3 *	..
DESTROYER . . .	..	1	..
TORPEDO-GUNBOAT .	1 (1 *in reserve*)	..	..

* Will be reduced to 1.

Note.—The French have the Protet, second-class cruiser, in commission in the Pacific.

to other Powers. Russia, Germany, and the United States have all improved their position as naval Powers, and when those vessels now building are completed they will each possess a larger number of first-class battleships than France. But it is only fair to point out that the French have recently concentrated their efforts on the construction of armoured cruisers, of which there are thirteen under construction, as compared with three for Germany and nine for the United States, while the new cruisers building for Russia can hardly be considered of the first class.

Is ship-building programme sufficient?

Considerable dissatisfaction has been expressed in certain quarters with the British shipbuilding programme for 1902–1903. Is it sufficient for our needs? We are certainly well up to the two-Power standard at the present moment, whether we take battleships built and building or only completed ships, or whether we take first-class battleships alone or battleships of all classes. We have 29 first-class battleships completed, to 17 for France and Russia. We have 41 first-class battleships built and building, as compared with 13 for France, 15 for Russia, or together 28. If we add the 16 ships built

and building for Germany, the 6 Japanese battleships might, in view of the recently concluded alliance with Japan, be taken into consideration. There are then 47 first-class battleships for Great Britain and Japan, as compared with 44 battleships for Russia, France, and Germany. Of second-class battleships we have 11, as against 20 for France and Russia. Of third-class battleships (which are unimportant in estimating relative strength) we have 17; France and Russia have 23. We have 49 first-class cruisers built and building, as compared with France 19, Russia 16, and Germany 6. It is only if we look upon the United States as a possible enemy that our naval position becomes serious. The most noteworthy fact in recent naval progress is the evident determination of the United States, as well as of Germany, to take front rank as a naval Power. With her enormous resources the United States will soon achieve this object. In any case, it would be difficult for us to maintain the two-Power standard against Germany and the United States, but the contingency of war between the two great branches of the Anglo-Saxon race is one which no Englishman cares to contemplate, and happily it is one which is yearly becoming more remote. If the United States be struck off the list of our possible enemies, the shipbuilding programme of the Government appears to be sufficient for our needs.

Smaller battleships needed.

The new British battleships are to have a displacement of 16,350 tons, and will therefore be larger than any battleship yet laid down. In other countries, as well as in this, the tendency in recent years has been to increase the displacement of first-class battleships. The latest French, United States, and Japanese ships have a displacement of 15,000 tons. The largest German and Russian battleships, on the other hand, do not exceed 13,500 tons, and these two Powers have 31 first-class battleships built and building, which would operate mainly in the Baltic and North Sea in the event of war. In an interesting paper by Admiral Sir John Hopkins, at the United Service Institution, in February, it was suggested that a certain number of smaller battleships should be built for the British Navy. Taking into consideration the increase of naval strength in the waters of northern Europe, the modification in our shipbuilding policy which would provide us with a larger number of battleships of more moderate size is desirable.

Re-arrangement of tables.

Some rearrangement of the comparative tables appears to have become necessary. The tables of third-class battleships and coast-guard ships have been amalgamated. The former has hitherto included several ships which could be classified with ships in the latter, and *vice versâ*. The Gorgon class is struck out of the British list; the armoured gunboats are struck out of the French, Russian,

and German lists, while the Italian and Russian ships which are more than thirty years old have also been eliminated. The development of the large armoured cruiser of about 10,000 tons displacement and over points to the necessity of remodelling the cruiser tables. Several first-class cruisers should drop into the second class. The Kaiserin Augusta, for instance, cannot be considered as in the same class with the Drake or Monmouth. Were this change made in the first class, it is clear that a very large proportion of the second-class cruisers should be dropped into the third class, while from the latter a number of the smaller cruisers, such as the Archer class, the German Blitz, &c., should be struck out. Vessels of under 19 knots speed can hardly be considered to fulfil the modern requirements of a cruiser; but in view of the fact that several such ships are still in commission as cruisers it has been decided to postpone till next year the reclassification of the cruiser classes.

Comparative Tables of British, French, Russian, Italian, German, United States, and Japanese Ships.

TABLE I.—FIRST-CLASS BATTLESHIPS.

GREAT BRITAIN.

Launched.	Name.	Displacement.
		tons.
1891	Empress of India	
1891	Hood	
1892	Ramillies	
1892	Repulse	14,150
1892	Resolution ...	
1892	Revenge	
1892	Royal Oak ...	
1891	Royal Sovereign	
1895	Renown	12,350
1894	Magnificent ...	
1895	Majestic	
1895	Prince George ...	
1895	Victorious ...	
1896	Cæsar	14,900
1896	Hannibal	
1896	Illustrious ...	
1895	Jupiter	
1896	Mars	
1897	Canopus	
1899	Glory	
1898	Albion	
1898	Goliath	12,950
1898	Ocean	
1899	Vengeance ...	
1898	Formidable ...	
1898	Irresistible ...	
1899	Implacable ...	
1899	Loudon	15,000
1899	*Venerable* ...	
1899	Bulwark	
1901	*Cornwallis* ...	
1901	*Duncan*	
1901	*Exmouth*	
1901	*Russell*	14,000
1901	*Albemarle* ...	
1901	*Montagu*	
1902	*Queen*	15,000
1902	*Prince of Wales*	
	Edward VII. ...	
	Commonwealth	16,350
	Dominion ...	
	41 ships.*	

FRANCE.

Launched.	Name.	Displacement.
		tons.
1891	Brennus	11,395
1894	Carnot	12,008
1893	Charles Martel	11,880
1893	Jauréguiberry ...	11,824
1895	Masséna	11,924
1896	Bouvet	12,200
1895	Charlemagne ...	
1896	Gaulois	11,275
1896	St. Louis	
1898	Iéna	12,052
1899	*Suffren*	12,728
	Patrie	11,865
	République ...	
	13 ships.†	

RUSSIA.

Launched.	Name.	Displacement.
		tons.
1892	Tria Sviatitelia	
1900	*Kniaz Potemkine Tavritchesky* ...	12,480
1894	Petropavlovsk...	
1894	Poltava	10,960
1895	Sevastopol ...	
1898	Peresviet	
1898	Oslabya	12,674
1900	*Pobieda*	
1900	Retvizan	12,700
1901	*Cesarevitch* ...	13,110
1901	*Borodino*	
	Alexander III....	
	Orel	13,516
	Kniaz Souvaroff	
	Slava	
	15 ships.‡	

ITALY.

Launched.	Name.	Displacement.
		tons.
1888	Re Umberto ...	13,825
1890	Sardegna	13,860
1891	Sicilia	13,375
1897	E. Filiberto ...	9,800
1897	San Bon	
1901	*Ra Margherita*	12,427
1901	*Benedetto Brin*	
	Ra Elena... ...	12,624
	Emanuele III. .	
	9 ships.‖	

GERMANY.

Launched.	Name.	Displacement.
		tons.
1891	Brandenburg ...	
1891	Kurfürst Friedrich Wilhelm	10,100
1891	Weissenburg ...	
1892	Wörth	
1896	Kaiser Friedrich III.	
1897	Kaiser Wilhelm II.	
1899	Kaiser Wilhelm der Grosse ...	11,000
1900	Kaiser Barbarossa	
1899	Kaiser Karl der Grosse	
1900	*Wittelsbach* ...	
1901	*Wettin*	
1901	*Zähringen* ...	11,800
1901	*Mecklenburg* ...	
1901	*Schwaben*... ...	
	H	13,000
	J	
	16 ships.§	

UNITED STATES.

Launched.	Name.	Displacement.
		tons.
1893	Indiana	
1893	Massachusetts...	10,288
1893	Oregon	
1896	Iowa	11,340
1898	Kearsarge... ...	11,565
1898	Kentucky... ...	
1898	Alabama	
1898	Illinois	11,525
1898	Wisconsin ...	
1901	*Maine*	
1901	*Missouri*	12,400
1901	*Ohio*	
	New Jersey ...	
	Georgia	
	Virginia	14,948
	Nebraska... ...	
	Rhode Island . .	
	17 ships.**	

JAPAN.

Launched.	Name.	Displacement.
		tons.
1896	Fuji	12,320
1896	Yashima	
1899	Asahi	15,000
1899	Hatsuse	
1898	Shikishima ...	14,850
1900	Mikasa	15,200
	6 ships.	

* 2 projected. † 4 projected. ‡ 1 projected. ‖ 3 projected. § *K* and *L* projected. ** 2 projected.

TABLE II.—SECOND-CLASS BATTLESHIPS.

GREAT BRITAIN.			FRANCE.			RUSSIA.			ITALY.			GERMANY.			UNITED STATES.			JAPAN.		
Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.
		tons.			tons.			tons.			tons.									
1888	Nile	11,940	1883	Baudin	11,911	1892	Georgi Pobiedonosetz	10,280	1880	Italia...	14,387									
1887	Trafalgar... ...		1879	Duperré	11,200	1891	Navarin	10,206	1883	Lepanto	14,400									
1886	Anson	10,600	1881	Courbet	10,808	1886	Catherine II. ...		1885	Andrea Doria ...										
1885	Benbow	10,600	1879	Dévastation ...	10,704	1887	Sinope	10,181	1884	Lauria	11,000									
1885	Camperdown ...	10,600	1885	Formidable ..	12,165	1886	Tchesmé		1885	Morosini										
1882	Collingwood ...	9,500	1886	Hoche	10,997	1894	Sissoi Veliky ...	8,880												
1885	Howe	10,300	1890	Magenta	10,851	1896	Rostis'av													
1884	Rodney	10,300	1887	Marceau	10,850	1889	Nicolai I.	9,672												
1887	Sans Pareil ...	10,470	1887	Neptune	10,983	1887	Alexander II. ...	9,927												
1893	Barfleur	10,500	1899	Henri IV. ...	8,948	1890	Dvenadzat Apostoloff ...	8,076												
1892	Centurion... ...																			
	11 ships.			10 ships.			10 ships.			5 ships.										

TABLE III.—THIRD-CLASS BATTLESHIPS AND COASTGUARD SHIPS.

GREAT BRITAIN.

Launched.	Name.	Displacement.
		tons.
1875	Alexandra ...	9,490
1882	Colossus	9,420
1882	Edinburgh ...	
1871	Devastation ...	9,330
1872	Thunderer ...	
1875	Dreadnought ...	10,820
1876	Inflexible... ...	11,880
1870	Sultan	9,290
1867	Hercules	8,680
1868	Monarch	8,320
1881	Conqueror... ...	6,200
1885	Hero	
1872	Rupert	5,440
1879	Orion...	4,870
1870	Hotspur	4,010
1870	Abyssinia ...	2,900
1870	Magdala	3,340
	17 ships.*	

FRANCE.

Launched.	Name.	Displacement.
		tons.
1876	Redoutable ...	9,437
1885	Caiman	7,239
1883	Indomptable ...	7,234
1885	Requin	7,822
1881	Terrible	7,575
1892	Bouvines	6,610
1893	Tréhouart... ...	6,620
1892	Jemmapes ..	6,592
1892	Valmy	
1877	Fulminant ...	5,965
1883	Furieux	5,019
1876	Tempête	4,869
1880	Tonnant	5,091
1875	Tonnerre	5,858
1878	Vengeur	4,709
	15 ships.	

RUSSIA.

Launched.	Name.	Displacement.
		tons.
1872	Peter Veliky ...	9,891
1875	Popoff	3,590
1873	Novgorod... ...	2,706
1894	Adm. Senjavin	4,126
1893	Adm. Oushakoff	
1896	Gen. Adm. Apraxine ...	4,200
	Adm. Boutakoff X	5,985
	8 ships.	

ITALY.

Launched.	Name.	Displacement.
		tons.
1878	Dandolo	11,202
1876	Duilio	10,138
	2 ships.	

GERMANY.

Launched.	Name.	Displacement.
		tons.
1880	Baden	7,441
1878	Bayern	
1877	Sachsen	
1878	Württemberg...	
1874	Deutschland ...	7,319
1874	Kaiser	7,531
1884	Oldenburg ...	5,200
1890	Beowulf	4,100
1891	Frithjof	3,500
1893	Hagen	4,100
1892	Heimdall	
1892	Hildebrand ...	
1889	Siegfried	3,500
1895	Aegir...	3,600
1894	Odin	
	15 ships.	

UNITED STATES.

Launched.	Name.	Displacement.
		tons.
1892	Texas	6,315
1883	Amphitrite ...	3,990
1876	Miantonomoh ...	
1883	Monadnock ...	
1883	Terror	
1891	Monterey	4,084
1884	Puritan	6,060
1900	*Arkansas*... ...	4,000
1900	*Nevada*	
1901	*Florida*	
1900	*Wyoming*... ...	
	11 ships.	

JAPAN.

Launched.	Name.	Displacement.
		tons.
1882	Chin Yen ...	7,400
1890	Hei-Yen	2,000
	2 ships.	

* From British List Agamemnon, Ajax, Glatton, etc., have been removed.

TABLE IV.—FIRST-CLASS CRUISERS.

GREAT BRITAIN.

Speed.	Name.	Displacement.
kts.		tons.
16	Impérieuse	8,400
16	Warspite	
21½	Blake	9,000
21¼	Blenheim	
19¾	Crescent	7,700
20	Edgar	7,350
20	Endymion ...	7,350
19¾	Gibraltar	7,700
20	Grafton	7,350
20	Hawke	7,350
19¾	Royal Arthur ...	7,700
19¾	St. George ...	7,700
20	Theseus	7,350
22	Powerful	14,200
22	Terrible	
20½	Andromeda ...	11,000
20½	Diadem	
20½	Europa	
20½	Niobe	
20¾	Amphitrite ...	11,000
20¾	Argonaut	
20¾	Ariadne	
20¾	Spartiate	
21	Aboukir	12,000
21	Cressy	
21	Hogue	
21	Sutlej	
21	*Euryalus*	
21	Bacchante ...	
23	*Drake*	14,100
23	*Good Hope* ...	
23	*King Alfred* ...	
23	*Leviathan* ..	
23	*Monmouth* ...	9,800
23	*Kent*	
23	*Bedford*	
23	*Essex*	
23	*Berwick*	
23	*Cornwall*	
23	*Cumberland* ...	
23	*Donegal*	
23	*Lancaster* ...	
23	*Suffolk*	
	Devonshire Cl. (6)	10,200
	49 ships.*	

FRANCE.

Speed.	Name.	Displacement.
kts.		tons.
20	Dupuy de Lôme	6,406
19	D'Entrecasteaux	8,114
23	Guichen	8,277
23	Jeanne d'Arc ...	11,329
23	Châteaurenault	8,018
21	*Desaix*	7,700
21	*Dupleix*	
21	*Kléber*	
21	*Dupetit Thouars*	9,517
21	Gueydon	
21	Montcalm ...	
21	*Condé*...	10,014
21	*Sully*	
21	*Gloire*	
21	*Marseillaise* ...	
21	*Amiral Aube* ...	
21	*Léon Gambetta*	12,416
21	*Jules Ferry* ...	
21	*Victor Hugo* ...	
	19 ships.†	

RUSSIA.

Speed.	Name.	Displacement.
kts.		tons.
16½	Admiral Nahimoff	8,524
18	Pamyat Azova	6,675
18	Rurik	10,933
20	Rossia	12,130
20	Aurora	6,630
20	Diana	
20	*Pallada*	
20	Gromoboi	12,236
21	*Bayan*	7,800
23	*Askold*	6,500
23	*Bogatyr*	
23	Varyag	
23	*Kagul*	6,250
23	*Otchakoff*	
23	*Oleg*	
23	*Vitiaz*	
	16 ships.	

ITALY.

Speed.	Name.	Displacement.
kts.		tons.
20	Carlo Alberto...	6,396
20	Vettor Pisani ...	
20	Giuseppe Garibaldi ...	7,282
20	Varese	
20	*F. Ferruccio* ...	
	5 ships.‡	

GERMANY.

Speed.	Name.	Displacement.
kts.		tons.
21	Kaiserin Augusta	6,231
19	Fürst Bismarck	10,650
20½	Prinz Heinrich	8,868
20½	*Prinz Adalbert*	9,000
20½	*K. Wilhelm Ersatz* ...	
	Kaiser Ersatz...	
	6 ships.‖	

UNITED STATES.

Speed.	Name.	Displacement.
kts.		tons.
21·9	Brooklyn	9,215
21	New York ...	8,200
22·8	Columbia	7,375
23	Minneapolis ...	
22	*West Virginia*	13,680
22	*California* ...	
22	*Pennsylvania*	
22	*Colorado*	
22	*Maryland* ...	
22	*South Dakota*...	
22	*St. Louis*	9,700
22	*Charleston* ..	
22	*Milwaukee* ...	
	13 ships.§	

JAPAN.

Speed.	Name.	Displacement.
kts.		tons.
21½	Asama	9,750
21½	Tokiwa	
21	Azuma	9,436
20	Yakumo	9,850
21	Idzumo	9,750
21	Iwate	
	6 ships.	

* 2 projected. † 2 projected. ‡ 1 projected. ‖ 2 projected. § 2 projected.

Table V.—Second-Class Cruisers.

GREAT BRITAIN.

Speed.	Name.	Displacement.
kts.		tons.
16	Aurora	
16	Australia	
16	Galatea	
16	Immortalité ...	5,600
16	Narcissus... ...	
16	Orlando	
16	Undaunted ...	
17	Amphion... ...	
17	Arethusa	
17	Leander	4,300
17	Phaeton	
17	Forth	
17	Mersey	
17	Severn	4,050
17	Thames	
19	Astræa	
19½	Bonaventure ...	
19½	Cambrian... ...	
19¼	Charybdis ...	
19½	Flora...	4,360
19½	Forte...	
19½	Fox	
19¼	Hermione... ...	
19¾	Æolus	3,600
20	Andromache ...	3,400
20	Apollo	3,400
19¾	Brilliant	3,600
19¾	Indefatigable ...	3,600

FRANCE.

Speed.	Name.	Displacement.
kts.		tons.
18	Bruix	4,754
18	Chanzy	4,933
18	Charner	4,792
18	Latouche Tréville	4,756
19	Pothuau	5,360
19	Cécille	5,933
19	Tage	7,589
19½	Alger	4,382
19	Isly	4,477
19	Jean Bart... ...	4,109
19¼	Bugeaud	3,740
19¼	Chasseloup-Laubat	3,758
19¼	Friant	3,739
19¼	Pascal	4,015
19	Descartes	3,990
17	Sfax	4,728
20	Suchet	3,440
19	Cassard	3,952
19	D'Assas	4,000
19	Duchayla... ...	3,952
19	Catinat	4,065
19	Protet	4,055
23	Jurien de la Gravière ...	5,605

RUSSIA.

Speed.	Name.	Displacement.
kts.		tons.
16	Dimitri Donskoi	5,882
15	Vladimir Monomach	6,061
14	Minin	6,136
15	Gertzog Edinburgski	5,050
14	General Admiral ...	4,722
17½	Admiral Korniloff ...	5,817
20	Svietlana	3,828

ITALY.

Speed.	Name.	Displacement.
kts.		tons.
19	Marco Polo ...	4,527
20	Vesuvio	3,373
18	Etna	3,474
17½	Fieramosca ...	3,542
19	Stromboli... ...	3,420

GERMANY.

Speed.	Name.	Displacement.
kts.		tons.
20	Gefion	4,207
20	Irene...	4,400
19	Prinzess Wilhelm ...	
21	Freya	
21	Hansa	
21	Hertha	5,650
21	Victoria Luise	
21	Vineta	

UNITED STATES.

Speed.	Name.	Displacement.
kts.		tons.
20	Albany	3,600
20	Baltimore... ..	4,413
18	Chicago	4,500
19	Newark	4,098
20	New Orleans ...	3,600
21½	Olympia	5,800
19½	Philadelphia ...	4,324
19	Cincinnati ..	3,213
19	Raleigh	
19½	San Francisco...	4,098

JAPAN.

Speed.	Name.	Displacement.
kts.		tons.
17	Hashidate ...	
17	Itsukushima ...	4,277
17	Matsushima ...	
18½	Naniwa	3,700
18½	Takachiho ...	
22	Chitose	4,760
22	Kasagi	
23	Takasago	4,160
23	Yoshino	4,180
23	*Unnamed...* ...	4,160

$19\frac{3}{4}$	Intrepid	3,600						
$19\frac{3}{4}$	Iphigenia	3,600						
20	Latona	3,400						
20	Melampus ...	3,400						
20	Naiad	3,400						
$19\frac{3}{4}$	Pique	3,600						
$19\frac{3}{4}$	Rainbow	3,600						
$19\frac{3}{4}$	Retribution ...	3,600						
20	Sappho	3,400						
20	Scylla	3,400						
$19\frac{3}{4}$	Sirius	3,600						
$19\frac{3}{4}$	Spartan	3,600						
20	Sybille	3,400						
20	Terpsichore ...	3,400						
20	Thetis	3,400						
20	Tribune	3,400						
$19\frac{1}{2}$	Diana							
$19\frac{1}{2}$	Dido							
$19\frac{1}{2}$	Doris...							
$19\frac{1}{2}$	Eclipse							
$19\frac{1}{2}$	Isis	5,600						
$19\frac{1}{2}$	Juno							
$19\frac{1}{2}$	Minerva							
$19\frac{1}{2}$	Talbot							
$19\frac{1}{2}$	Venus							
19	Arrogant							
19	Furious	5,750						
19	Gladiator							
19	Vindictive ...							
20	Hermes							
20	Highflyer... ...							
20	Hyacinth	5,600						
21	*Challenger* ...							
21	*Encounter* ...							
	62 ships.		23 ships.	7 ships.	5 ships.	8 ships.	10 ships.	10 ships.

Table VI.—Third-Class Cruisers.

GREAT BRITAIN.

Speed.	Name.	Displacement.
kts.		tons.
18	Iris	3,730
18	Mercury	
16¾	Fearless	1,580
16¾	Scout...	
16½	Archer	1,770
16½	Brisk...	
16½	Cossack	
16½	Mohawk	
16½	Porpoise	
16½	Racoon	
16½	Tartar	
17	Alacrity	1,700
17	Surprise	
17¾	Barham	1,830
17¼	Bellona	
16¼	Barracouta ...	1,580
16¾	Barrosa	
16¾	Blanche	
16¾	Blonde	
19	Magicienne ...	2,950
19	Marathon ...	
19	Melpomene ...	
19	Medea	2,800
19	Medusa	
19	Pallas	2,575
19	Pearl	
19	Philomel	
19	Phœbe	
19	Katoomba ...	
19	Mildura	
19	Ringarooma ...	
19	Tauranga... ...	
19	Wallaroo	
20½	Pelorus	2,135
20	Proserpine ...	
20	Pactolus	
20	Pegasus	
20	Perseus	
20	Pomone	
20	Prometheus ...	
20	Psyche	
20	Pyramus	
20	Pandora	2,200
20	Pioneer	
21¾	*Amethyst*	3,000
21¾	*Topaze*	
	46 ships.	

FRANCE.

Speed.	Name.	Displacement.
kts.		tons.
18	Milan	1,733
19¼	Coëtlogon	1,932
20¼	Cosmao	1,954
20½	Forbin	1,820
20½	Lalande	1,926
20¼	Surcouf	2,014
20½	Troude	2,026
20	Davout	2,291
20	Linois	2,345
20	Galilée	2,317
20	Lavoisier	
20½	D'Estrees... ...	2,452
20½	Infernet	
	13 ships.	

RUSSIA.

Speed.	Name.	Displacement.
kts.		tons.
15	Rynda	3,508
15½	Pamyat Merkuria ...	3,000
25	*Novik*	3,000
25	*Boyarin*	
25	*Almaz*	
25	*Jemtchug*... ...	
25	*Izumrud*	
25	*Unnamed* ...	
	8 ships.	

ITALY.

Speed	Name.	Displacement.
kts.		tons.
21	Piemonte	2,500
19	Calabria	3,508
19½	Dogali	2,055
18	Elba	2,690
17½	Giovanni Bausan	2,922
19	Etruria	2,245
21	Lombardia ...	
18	Liguria	
18	Umbria	
20	Puglia	2,550
16	C. Colombo ...	2,675
	11 ships.	

GERMANY.

Speed.	Name.	Displacement.
kts.		tons.
16	Blitz	1,360
16	Pfeil	
16½	Bussard	1,827
16	Condor	1,614
16	Cormoran	
16	Geier	
16	See-Adler ...	
15½	Falke	1,703
23	Greif...	1,971
23	Hela	
19	Gazelle	2,650
21½	Nymphe	2,665
21½	Niobe	
21	*Ariadne*	
21	*Medusa*	
21	*Thetis*	
21	*Amazone*	
22	*Frauenlob* ...	
22	*H*	
22	*J*	
	20 ships.*	

UNITED STATES.

Speed.	Name.	Displacement.
kts.		tons.
15½	Atalanta	3,000
15½	Boston	
18½	Detroit	2,089
18½	Marblehead ...	
18½	Montgomery ...	
16½	*Denver*	3,400
16½	*Des Moines* ...	
16½	*Chattanooga* ...	
16½	*Galveston* ...	
16½	*Tacoma*	
16½	*Cleveland*... ...	
	11 ships.	

JAPAN.

Speed.	Name.	Displacement.
kts.		tons.
20	Akashi	2,700
19	Akitsushima ...	3,150
18	Idzumi	2,950
20	Yayeyama ...	1,600
20	*Miyako*	1,800
20	Suma	2,700
20	*Niitaka*	3,420
20	*Tsushima*... ...	3,420
	8 ships.	

* 3 projected.

TABLE VII.—TORPEDO GUNBOATS.

GREAT BRITAIN.

Speed.	Name.	Displacement.
kts.		tons.
19	Grasshopper ...	
19	Sandfly	525
19	Spider	
18½	Rattlesnake ...	550
20	Assaye	
20	Boomerang ...	
20	Gleaner	
19	Gossamer	
20	Karrakatta ...	
20	Plassy	735
20	Salamander ...	
20	Seagull	
20	Sharpshooter ...	
20	Sheldrake ...	
20	Skipjack	
20	Spanker	
20	Speedwell... ...	
19	Alarm	
19	Antelope	
19	Circe	
19	Hebe	
19	Jaseur	
20	Jason...	810
19	Leda	
19	Niger	
19	Onyx	
19	Renard	
20½	Speedy	
19	Dryad	
19	Halcyon	
19	Harrier	1070
19	Hazard	
19	Hussar	
18	Polyphemus ...	2640
	34 ships.	

FRANCE.

Speed.	Name.	Displacement.
kts.		tons.
17¾	Condor	1243
17	Epervier	1288
17½	Faucon	1239
18	Fleurus	1310
17½	Vautour	1235
18¾	Wattignies ...	1292
18½	Bombe	420
18	Couleuvrine ...	435
18	Dague	408
18	Dragonne... ...	410
18	Flèche	425
18	Lance	402
18	Sainte-Barbe ...	437
18	Salve...	413
18¾	Léger	517
18½	Lévrier	505
21½	Casabianca ...	960
21½	Cassini	958
21½	D'Iberville ...	967
23	Dunois	896
23	Lahire	
	21 ships.	

RUSSIA.

Speed.	Name.	Displacement.
kts.		tons.
20	Captain Sacken	742
20	Lieutenant Ilyn	714
22	Gaidamak ...	
22	Vzadnik	400
22	Griden	
21	Kazarsky... ...	
22	Posadnik	462
22	Voevoda	448
21	Abrek	535
	9 ships.	

ITALY.

Speed.	Name.	Displacement.
kts.		tons.
20	Aretusa	833
20	Calatafimi ...	833
21	Caprera	833
17	Confienza	768
20	Euridice	833
19	Goito...	812
19½	Iride	833
19	Minerva	833
19	Montabello ...	814
19	Monzambano ...	840
19	Partenope... ...	833
18	Tripoli	848
20	Urania	833
20	Saetta	400
20	Folgore	370
23	Agordat	1313
23	Coatit	
	17 ships.	

GERMANY.

Speed.	Name.	Displacement.
kts.		tons.
19	Jagd	1230
19	Wacht	
22½	Komet	931
21	Meteor	
	4 ships.	

UNITED STATES.

Speed.	Name.	Displacement.

JAPAN.

Speed.	Name.	Displacement.
kts.		tons.
21	Tatsuta	875
21	*Chihaya*	875
	2 ships.	

EFFECTIVE FIGHTING SHIPS, BUILT AND BUILDING.

Class.	Great Britain.			France.			Russia.			Italy.			Germany.			United States.			Japan.		
	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.
Battleships—																					
1st-Class	29	12	41	10	3	13	7	8	15	5	4	9	9	7	16	9	8	17	6	..	6
2nd-Class	11	..	11	10	..	10	10	..	10	5	..	5	..	..	..	..	..	..	..	..	..
3rd-Class	17	..	17	15	..	15	6	2	8	2	..	2	15	..	15	7	4	11	2	..	2
Total Battleships	57	12	69	35	3	38	23	10	33	10	6	16	24	7	31	16	12	28	8	..	8
Cruisers—																					
1st-Class	28	21	49	6	13	19	8	8	16	4	1	5	3	3	6	4	9	13	6	..	6
2nd-Class	60	2	62	23	..	23	7	..	7	5	..	5	8	..	8	10	..	10	9	1	10
3rd-Class	46	..	46	13	..	13	2	6	8	11	..	11	13	7	20	5	6	11	5	3	8
Total Cruisers	134	23	157	42	13	55	17	14	31	20	1	21	23	11	34	19	15	34	20	4	24
Torpedo-Gunboats	34	..	34	21	..	21	9	..	9	17	..	17	4	..	4	..	..	..	1	1	2

CHAPTER IV.

Naval Reserves.

The reserve forces of the Navy have been discussed in many former numbers of the *Naval Annual*. The subject can never long be laid aside. The circumstances are always changing. We must meet them.

Present manning system.

Our present system of manning gives us a fine body of officers and men, inspired by and worthy of the noble traditions of the past. It affords no adequate power of expansion. Looking at the problem from the standpoint of the statesman, it should be the aim to strengthen our Navy, as far as possible, by means which least tend to stimulate the regrettable rivalry in the maintenance of excessive armaments. Constant and large additions to the permanent force have that effect. A force in reserve does not in the same degree provoke to retaliatory measures.

Manning in the past.

No naval Power has ever yet maintained in peace the full numbers required in war. The fleets with which our most memorable victories were won were not manned by permanent men. The numbers of seamen in the Navy were increased from 17,301 in 1792 to 120,140 in 1798, and again from 77,765 in 1802 to 139,605 in 1808. In the Crimean War the numbers increased from 39,000 in 1852 to 76,000 in 1855.

United States.

The fleets of the United States, potentially the strongest of the naval Powers, have not been manned by permanent men. The Secretary of the United States Navy, in his report of December, 1865, described the stupendous efforts which had been made by the naval department in the war which had just been brought to a close. From 7000 men in the naval service at the commencement of the rebellion, the number had been raised to 58,600 at its close. In the short war with Spain the number of men in the navy increased from 12,500 to 24,123.

Foreign Naval Reserves.

Great Britain stands alone among the maritime Powers in manning her Navy in peace wholly with men enlisted for long service. In pursuance of this policy we have added in the last eleven years no less than 55,000 men to our permanent force. We have brought up the strength to 122,500, as against Germany 31,157, France 50,000, Russia 59,000, Italy 27,000, United States 28,000, and Japan 24,000. In the strength of our permanent force we have a decided superiority. Our reserves are weak. We have the Royal Naval Reserve with a strength of 1896 officers and 25,214 men, including 3509 firemen. We have the Fleet Reserve 10,500,

the Pension Reserve 3078. In addition to the reserves supplied by the auxiliary forces we have a reserve in the Navy itself. It consists of the officers and men employed during peace in the training services, and in ships of a type useless for war. We may estimate their number at one-third of our whole force. This admission may seem to weaken the case for a reinforcement of the reserves. It certainly strengthens the argument against adding to the permanent force in the future, as in recent years. Our reserves will not compare in numbers with the force which the Inscription Maritime, created by the genius and statesmanship of Colbert, secures to the French Navy. The total number on the rolls of the Inscription Maritime is 211,000, including 9000 aged 18 to 20 and 111,000 aged 20 to 50. The reserves are relied upon to give fully 50,000 effectives.

Looking to the manning requirements of the engine room, the increase of secondary armaments in large ships, and the multiplication of small craft, everything points to the employment of larger numbers in the future than in the past. In a recent letter to the *Times*, Admiral Sir Edmund Fremantle wrote as follows: "I am certain that were we at war with a maritime Power, say France, alone, we should in six months have 250,000 men in the Navy, good, bad, and indifferent. The question is whether we prefer to look forward and make some provision for these crews being capable and effective, or are we to be unready and unprepared, as usual?" The addition made in late years to the permanent force may be accepted as necessary. It is absolutely essential that all ratings requiring special skill should be filled by experienced men. It is not necessary that every man employed in passing ammunition or in the duties of the stokehold should have received a long training in the Navy.

Relative cost, *personnel*.

Considerations relating to expense, though perhaps less grave than those which relate to efficiency, should not be disregarded. The votes for wages and victualling in the British Navy Estimates have increased from £5,039,000 in 1891–1892 to £8,592,250 for 1902–1903. The non-effective vote has already reached a total of £2,328,000; it will be larger in future years. In France the votes for pay increased from £1,542,276 in 1892 to £2,597,000 in 1901.* The vote for victualling and clothing for the same years increased from £998,000 to £1,236,000. In Russia the expenditure for Navy pay increased from £373,000 in 1892 to £603,000 in 1902, and the charge for clothing and victualling from £276,000 to £507,000. It will be seen that the charge for the permanent force was increased in the British Navy Estimates by more than £3,500,000, as against

* Last year for which comparison possible, owing to transfer of Marines to War Department.

£1,292,000 in the French Navy Estimates, and £461,000 for the Russian Navy, in the periods named. If we continue to add to our permanent force on the scale of recent years, we shall ten years hence have 50,000 more men in the Navy, involving an annual charge of £12,000,000 for the pay and victualling. To the effective votes we have to add the growing charge on the non-effective votes for pay and pensions.

Let us assume that the supplies can be obtained from Parliament. Two questions still arise:

1. Is it possible to employ and to train so large a force? Life in barracks, and harbour training, will not suffice.

2. Would expenditure on a permanent force, so greatly in excess of the strength in other navies, be the most effective application of the money? Would not our resources be applied to more advantage in the construction of new ships?

Relative expenditure on ship-building.

The consideration of the subject of manning, in its financial aspects, would be incomplete without some reference to the relative expenditure on manning and shipbuilding in the British and in foreign navies. It has been laid down as a first principle of our national policy that the strength of the British Navy shall be fully equal to a two-Power standard. Parliament has been liberal in granting supplies. The Estimates have gone up from £14,240,000 in 1892–1893 to £31,255,500 for 1902–1903. The resources placed at the disposal of the British Admiralty have greatly exceeded those in the hands of other naval administrations. In the ten years 1892–1902, we have an aggregate increase in the British Navy Estimates of £17,055,000. The expenditure on new construction has grown from £4,654,632 at the earlier date to £9,473,000 in 1902–1903. In France the aggregate expenditure on the Navy increased from £8,736,000 to £12,272,000 in 1902, and the expenditure on new construction from £2,038,000 in 1892 to £4,145,000 in 1901.* A far larger proportion of the increase in the expenditure on the Navy has been allotted to new construction in France, owing to the reliance placed on an efficient system of reserves.

Need for Reserves.

Where expenditure on manning is kept down by conscription, the appropriations to shipbuilding must always be large as compared with those of the British Navy. If in future years we can approach nearer to the distribution of resources under the French Naval Administration without loss of efficiency, larger appropriations may be made to shipbuilding without adding to the public charge. Such appropriations are desirable. We have to keep pace with the vigorous efforts of other Powers in the construction of new ships. We have

* Complete figures for 1902 not yet available.

to keep pace with the progress of invention by reconstruction. Sound and seaworthy ships fall out of date in armour, armaments, and propelling machinery. Reconstruction, therefore, as well as new construction, is necessary to keep the Navy at a proper standard of strength. In the present state of the British Navy a reinforcement of ships is more urgent than an addition to the numbers of men. Battleships cannot be improvised. The permanent force can be supplemented, without loss of efficiency, from well-trained reserves.

Supply of seamen from Mercantile Marine falling away.

It is not necessary to insist further on the essential importance of the reserves for manning the Navy. Let us turn to the means by which they may be recruited. Our dependence thus far has been chiefly placed on the Mercantile Marine. In the words of the preamble to the Merchant Shipping Act, "the prosperity, strength, and safety of this United Kingdom do greatly depend on a large, constant, and ready supply of seamen." In pursuance of this policy the Royal Commission on Manning recommended the creation of a reserve for the Navy recruited from a body of seamen for whose training the State and the shipowners were to work together. The plan was accepted by Parliament. It has given us our Royal Naval Reserve. In the preparation of the Report of the Commission Lord Cardwell took a leading part. His reputation as an administrator still lives. With him were associated the most competent authorities of the day in matters relating to shipping. The report was worthy of the eminent men by whose joint labours it was produced.

The lapse of time has brought us face to face with new conditions. We do not require seamen in the Navy as in the elder day, nor does the Mercantile Marine produce them. In the importance of its Mercantile Marine the British Empire still holds the pride of place, but the new tonnage is steam tonnage, most efficient for the work it is designed to do, for the cheap and rapid conveyance of mails, passengers, and merchandise, but no longer now as formerly a nursery for seamen. The numbers employed in sailing ships have fallen to 30,000, showing a decrease of some 20,000 since 1892. Large numbers of stokers are employed in the Mercantile Marine; at present they are not as suitable as we could wish to form a reserve for the Navy. It is difficult to maintain discipline among the class from which they are largely drawn. Popular education does not furnish recruits for disagreeable duties which require no special skill.

Foreigners in British ships.

With the vast increase in steam tonnage we see a steady reduction in the number of British seamen, the falling off being mainly among the younger men. The number of foreigners employed is rapidly increasing. The analysis of the returns by the Committee appointed by the Board of Trade to inquire into the manning of our merchant

ships gave the following results:—In 1891, 131,375 seamen were employed in the foreign trade of the United Kingdom, 22,052 being foreigners and 21,322 lascars, or nearly 33 per cent. in all non-British. The number of A.B.'s in the foreign trade was 40,265, of whom 12,226 were foreigners and 6953 lascars, or over 47 per cent. non-British. In sailing vessels 42·7 per cent. of the A.B.'s were foreigners. The number of firemen was 24,372, of whom 3224 were foreigners and 77,785 lascars, or over 43 per cent. non-British. The latest return issued by the Registrar-General of Seamen gives a total of 247,440 persons employed. Of these 36,892 were foreigners and 36,093 lascars.

Causes of the decline of British seamen.

Many causes have contributed to diminish the number of British seamen. The life of the sailor in the sailing ship was a life of adventure; service in a steamship is monotonous. With the disappearance of the white-winged sailing ship the sea has lost its old charm, the charm of being a sailor. Apprenticeship to the sea has ceased among the classes from which the working hands are recruited. The statistics were given by Mr. Ritchie in a speech delivered on board the Worcester. British tonnage had doubled since 1862, while the apprentices are only one-fourth of the former number. In sailing ships one out of every ten persons employed is an apprentice; in steamships one out of every 300.

The general advance in wages on shore has not been fully shared by the seamen. The pay of able seamen averages £3 per month in sailing ships, and £4 10*s*. in steamships; the earnings of firemen are slightly higher than those of seamen. The current rate of wages paid to seamen and firemen on board foreign shipping may be taken at £2 10*s*. to £3 per month. The British seaman's wages are necessarily determined by foreign competition. They compare favourably with the standard of living and earnings in Continental Europe and with agricultural wages in England; they compare unfavourably with the rates obtainable in our skilled trades ashore.

Sir Edward Reed's Committee

In confirmation of this view I may refer to the report of the Committee on the Manning of Merchant Ships, appointed by the Board of Trade, with Sir Edward Reed as chairman:—

"However undesirable it may be that English sailors should thus be ousted by foreigners from British ships, and however dangerous this change may prove to the State in time of war, the fact must be recognised that the existing unrestricted admission of foreigners and lascars may eventually result in further diminishing, outside of the Royal Navy, the number of British seamen. The qualified British seaman, enjoying no preference of employment over even the unqualified foreigner, and receiving no better pay, may

abandon a competition in which the conditions are decidedly unfavourable to him.

"While, therefore, it is impossible to conceive any state of things more unfavourable to the British sailor than the present, it is equally impossible to conceive any state of things more favourable to the British shipowner, in so far as concerns a cheap and a perfectly open market for the labour which he has to employ. The shipowner may select his *employés* from all nationalities, at any rates of wages, and may also (as the law now stands), at his discretion or caprice, either require or dispense with proofs of qualification. On the other hand, the British sailor, having perhaps qualified himself for the rating of A.B. by four years' service before the mast, may present himself at a shipping office and sign articles—on no better terms as regards food, berthing, and pay—with Scandinavians, Germans, French, Italians, Greeks, Turks, and negroes, some of whom may possess no proof of qualification, and no adequate knowledge of the English language, but who are protected as regards employment in vessels of their own nationalities, wherever such vessels exist. It is the opinion of the Committee that any deterioration of British seamen which may now exist is not owing to the decadence of our countrymen, nor to their dislike for the sea, but to the lack of sufficient attraction in the sea service as at present conducted to draw and hold the best class of British workmen, and in a great measure to an insufficient number of boys being trained to supply the necessary waste in the number of A.B.'s."

In quoting these observations it is not intended to cast any reflection upon the British shipowner. In the maritime countries of the European continent, as in the United States, the business of the shipowner is supported by subsidies and protected from competition. Since the repeal of the Navigation Laws we have consistently adhered to the policy of free and open competition. The most energetic rivals of the British shipowner are those of his own nationality. In the shipping trade exceptional prosperity comes rarely, never lasts long, and is sure to lead to reckless bidding. Competition can only be met by cutting down expenses. Shipowners have no difficulty in manning their ships at the current rate of wages.

British seamen have not deteriorated.

It is often said that foreigners are employed in British ships because they are steady and reliable, while British seamen are unsteady and unreliable. The unfavourable opinions we hear to-day have been heard before. During the inquiry held by the Commission on Unseaworthy Ships witness after witness dilated on the profligacy, the drunkenness, the physical, professional and moral deterioration of our seamen. Going further back, to the inquiries of the Manning

Committee of 1853, the chairman of the London Shipowners, Mr. Phillips, declared that the seamen were a demoralised race, and that the permission to man British ships with foreign seamen would be productive of great good.

In the present—as in the past—the true view with regard to the British seaman is rather this, that he, like other men, is the creature of habit and the product of circumstances. We have fewer seamen of the old type, for the obvious reason that sails have given way to steam. In seeking for explanations of the increase in the employment of foreigners, it is more reasonable and more just to the British seaman to look to the changed conditions rather than to the deterioration which some allege to have taken place. The increase in the number of foreigners in recent years is mainly in the Tropics. We carry on a vast trade with the East, and the route by the Suez Canal and the Red Sea lies in the hottest region of the globe. For the duties of the stokehold in a tropical climate men of the tropical races are the most suitable. The British stoker may stand to his work from sheer pluck—but he suffers. On deck the duties are those of unskilled labourers under constant exposure to a vertical sun. In relation to the manning of the Navy there is no cause for regret that lascars should be employed. English crews would deteriorate from the effects of climate. It is not desirable that the reserves should be recruited from the crews of steamships chiefly employed in tropical seas.

Stokers in Mercantile Marine.

Our review has shown that the resources we formerly possessed in the Mercantile Marine for the recruitment of seamen for the Naval Reserve are failing. Their gradual disappearance is inevitable. Seamen of the old type are not required as formerly in masted ships. There should be no difficulty in obtaining from other sources as many seamen-class men as we require for the Naval Reserve. We can get them, as will be shown later, from the fisheries and from colonial and volunteer reserves. A naval volunteer force will give us a reserve to the marines. To create a reserve of stokers is more difficult. It has already been said that while British stokers are employed in the Mercantile Marine in vast numbers—and they are second to none as hard workers—they are recruited from a class which is impatient of discipline. We have to devise means by which their discipline can be so improved as to fit them to be reserve men for the Navy. The unsatisfactory state of the Mercantile Marine—more especially in the class of firemen—is conspicuously shown in the returns of desertions. In 1900 there were no less than 58,000 cases, or 45 per cent. of the total number of engagements. In steamships the percentage of deserters was 49 per cent. for firemen

and 28 per cent. for A.B.'s. Stokers cannot be recruited from the class to which we may confidently look to supply a volunteer force for gunnery duties and as a reserve to the marines; nor can they be obtained ready-made from the fisheries and from our beachmen and 'longshore population. That is also the experience in France. The Inscription Maritime gives good men for deck duties, and boatmen of admirable skill. It does not supply men for the engine room and stokehold. The stokers drawn from the Inscription Maritime enter the service without experience of the work of the stokehold, and are trained in *écoles de chauffe*.

Reserve of stokers for Navy.

In the present condition of our Mercantile Marine, more especially in relation to the want of discipline in the fireman class, it seems clear that the force we require can only be created by training in the Navy. It is equally clear that in the present and the near future, for the manning of the engine rooms and stokeholds, the Navy should be self-dependent and self-contained. It should make provision for training not only men recruited for a full term of service in the Navy, but also a reserve of stokers entered for a short service in the Navy and a long time in the reserve. The reservists should serve long enough at sea to know their work. Seven years, or two commissions in sea-going ships, should suffice. Having completed their service in the Navy, the stokers in the reserves should, as far as possible, be held in hand by employment in the dockyards. They would receive their retainers as naval reservists in addition to ordinary wages. They should be sent to sea during manœuvres and on trial ships. Employment might be secured for the stokers of the reserves in large numbers in subsidized mail steamers under conditions to be arranged. Some contribution by the State to the wages of reservists might be necessary. The money would be well spent if it secured a reserve of stokers in constant practice in sea-going ships, driven at the highest rates of speed.

Short service.

It may be objected to a scheme for increasing the reserves by entering any class of men for short service in the Navy, that the crews of our ships in commission would be too young. When, however, the Navy is mobilised, the Coast Guard, the Fleet Reserve, and the Naval Reserve men will go afloat. All these classes consist of men of considerable standing. Short service will not be popular with naval officers. In the Army short service was stoutly resisted. It has given us the Army Reserve. It is well that we had such a reserve when war broke out in South Africa. In Germany, France, and Russia short service is accepted for all ratings not requiring special qualifications, as the only means by which adequate numbers can be passed into the reserves. The length of service afloat under

existing regulations is in France, forty-seven months; Russia, five to seven years; Italy, four; Germany, three; United States, four years. In Japan, volunteers engage for eight years. Conscripts serve four years in the active fleet. Half the seamen and two-thirds of the stokers are, it is stated, obtained by voluntary enlistment. In all navies except those of the United Kingdom and the United States, the training of reserves is rightly regarded as a main duty of the Navy in time of peace.

Many objections would be removed if ships were specially commissioned for the training of short-service stokers. This is what I would venture to recommend. And here it seems proper to remark that the administration of a service such as that of the British Navy must always be influenced, perhaps unduly, by the traditions of the past. We have inherited a perfect system of training in seamanship. It was begun in the brigs attached to the school-ships, carried forward in a sea-going squadron of masted ships, and completed in the Channel and foreign squadrons. We are now taking a new departure. The Admiralty has announced as a final decision that the masted training squadron shall no longer be kept up. Training ships for stokers should take their place. In the French service several ships are worked as *écoles de chauffe*. Italy has similar training ships. They may be seen constantly under way at Spezia.

Training of stokers in school-ships.

From the reserves recruited and trained in the Royal Navy let us turn to those drawn from the Mercantile Marine. It has been recommended by high authorities that a plan of training men for the Mercantile Marine and the reserve in school-ships should be organised on a large scale. It seemed the best way of improving the *morale* of the merchant service. Under the new conditions with which we have to deal, it seems necessary to be content with a less comprehensive scheme than that formerly advocated, and to limit proposals for the establishment of school-ships, so as to provide chiefly for the requirements for training stokers, to be drawn through the Mercantile Marine into the reserves. The Royal Commission on Manning recommended that school-ships should be established at the principal ports. School-ships were strongly recommended by the Royal Commission on Unseaworthy Ships, of which I had the honour to be a member, and by the Manning Committee of 1894, under the presidency of Sir Edward Reed. The committee urged that the country had provided liberally for technical education in other forms, and no technical training was more essential in this country than that of the sailor. Proposals for the establishment of school-ships were strongly supported at a representative meeting of county councillors, shipowners, and others, held in London in May of last year. It was resolved unanimously that the time had

come when an organised effort should be made to inaugurate a system of training boys for the Royal Naval Reserve upon the lines recommended in the Report of the Royal Commission of 1859, and successfully adopted in the Royal Navy.

At the date when the Royal Commission on Manning reported, a large supply of seamen-class men was needed for the Navy. The conditions of the present day are different. An increased supply of well-disciplined stokers is what we chiefly need. Much might be done by entering in school-ships boys seeking future employment as stokers. In the Royal service it is possible to raise a superior class for stokehold duties. Entered at an early age, systematically trained, accustomed to the strict discipline of a ship of war, worked only at intervals at full pressure in the stokehold, inspired by the prestige of the Royal service, and encouraged by the prospects of promotion and pension, a stoker as we find him in the Navy is a man of a different stamp from the stoker of the Mercantile Marine, who shares none of his advantages. We should secure a better class by entering boys at the age at which boys are entered for the Royal Navy, and keeping them for two years in a well-ordered school-ship. The number to be entered must depend upon the standard of strength to which it is deemed necessary that the reserve of stokers should be raised. It would be good policy on the part of the Admiralty to contribute the whole or a large part of the cost of training boys entered at the commercial ports for service as stokers in the reserve.

It would be well to begin on a limited scale, and gradually extend if the plan be found successful. A considerable number could be provided for in existing ships, which, with State aid, and under Admiralty or Board of Trade supervision, would be more efficient and more attractive to boys of good character and parentage than they are at present. They should cease to be regarded as industrial schools. Lads entered from such institutions are not welcomed in forecastles. We cannot expect it.

Reserve of stokers to be trained in Navy.

On leaving the school-ships the boys must be sent to sea either in the Navy or the Mercantile Marine. Receiving no special favours from the State, shipowners are under no obligations, and are disinclined to help in raising reserves for the Navy. The report of the Liverpool Steamship Owners' Association for 1901 has the following observations :—" The British Government has appointed a committee to enquire into the increasing employment of foreigners. There are not sufficient British seamen, and, if there were, life and property would not be more safe. No scheme based on the assumption that seamen of the Mercantile Marine could be called upon for service in

the Navy, even in the time of emergency, could meet the country's wants. If the seamen were called from their duties the whole food supply and general trade of the country would be disorganised to a disastrous extent." We have similar views in the report of the Hartlepool shipowners. They do not consider the question of the number of foreigners employed on British ships as serious. They have no desire to give their co-operation for the manning of the fleet. Their view is that if the Navy requires men, and will bring its pay and conditions more nearly into line with the rates paid and conditions prevailing in the Mercantile Marine, it can procure all the men required.

Freedom from inspection is the boon which the shipowner most desires. Chambers of shipping have been emphatic on this point. At the last meeting of the Chambers of Shipping of the United Kingdom, held in London, Mr. Angier, in moving a resolution in favour of continued efforts to train British apprentices to the shipping industry, remarked that "they must make a bold and united stand against any interference with this work of an army of faddists, and the misguided attempts always made by Governments to sandwich the work of manning the Naval Reserve with that of the Mercantile Marine."

Shipowners do not ask for State aid. They know that subsidies impartially granted to all would give no advantage against competitors, of whom the keenest and the ablest are their rivals under the British flag. Drawing an inference from past experience, shipowners anticipate that the premiums paid by the Government for the training of apprentices would be insignificant as against the gains or losses resulting from the wide fluctuations in the price of coal and the rates of freight. I have had the opportunity of conferring on this point with the leading shipowners of the present day, including the late Mr. Ismay, his son, and his partner, Mr. Graves. They did not see their way to render the Admiralty any effective help in the training of the reserves. A conference with the shipowners of the Tyne led to the same result. Sir Thomas Sutherland has put his view in writing. I am permitted to publish his letter. His opinion entirely coincides with those obtained from other sources.

7th March, 1902.

MY DEAR BRASSEY,—To whatever extent the Admiralty requires to have reserves, either in officers, seamen, or stokers, the Navy Estimates must bear the whole expense, and in the case of seamen or gunners and stokers, the Navy must give the initial training, and then pass the men into a reserve. The system could be carried out, as in the Army, by a three years' service, or perhaps even one year would suffice. The Mercantile Marine would, of course, be only too glad to give subsequent employment to men who had passed through the discipline of the Navy. But any hybrid attempt to make the Mercantile Marine sharers with the Admiralty in the creation of a Naval Reserve would, in my opinion, prove futile. Let the Admiralty boldly face the question without

having any regard to private shipowners. This is, in my judgment, the only true way to achieve success.

I think the case is different when we come to officers. Therein shipowners can lend a hand. I suppose the P. & O. Company have more officers on the books of the Naval Reserve than any other company has at the present time, and we have taken every measure to encourage our men to join that service. I don't know whether the Admiralty wants to increase the number of such officers, but if so I should think there would be no difficulty in devising the means to this end. The difficulty arises with the thousands of seamen and stokers who are wanted in a reserve, and, I repeat, the only true plan to act upon, in my opinion, is for the Navy to train these men for one, two, or three years, and then place them in the reserve. They would then have no difficulty in finding employment in the Mercantile Marine, and would be ready to rejoin the Navy when wanted. But all attempts to put on the shoulders of shipowners, even by means of liberal payment, the task of training reserves for the Navy will end in smoke. Shipowners have too much to do in attending to their own business.

Believe me,
Very sincerely yours,
THOS. SUTHERLAND.

The conclusion is clear that the boys entered for the reserve, and trained in school-ships at the mercantile ports, must, on leaving the school-ships, be taken in hand by the Admiralty. The training ships for stokers must be maintained on a sufficient scale to train:—(I.) Stokers going directly into the reserves. (II.) Those who may be entered for short service in the Navy, followed by a long term in the reserve. (III.) Those trained for long service in the Navy, who would fill the ratings requiring superior skill. When the reserve stokers have been trained, they will, as Sir Thomas Sutherland shows, readily find employment.

Regulations—Royal Naval Reserve.

Let us turn to the training of our existing forces. Proficiency and attention to drill are encouraged in the Navy by badge, pay, and promotion. In the Royal Naval Reserve such rewards are given with a niggardly hand, and it is a great disadvantage. I speak from the experience of six weeks' drill with naval reserve men on board the Royal Naval drill vessel in the London Docks.

Service on board a sea-going ship of war is necessary to efficiency. The regulations and conditions of service should be such as to make it popular and not irksome to reservists. For the training of the reserves in gunnery, the regulations, as originally laid down, required an attendance of twenty-eight days in the year in a harbour training ship. Later, six months' service in a sea-going ship of war was insisted upon. It was found that the new regulations tended to reduce numbers, and three months only are now required. There should be no cutting down of the training. Whether by payment of bounties or by an addition to pay or pension, the Admiralty should ensure that the Naval Reserve men put in such length of service afloat as may be required to secure efficiency.

It should be obligatory on every officer enrolled in the Royal Naval Reserve to serve twelve months in a sea-going ship of war.

Until they have so served, and are favourably reported upon by their captain, the Naval Reserve officers should be considered probationers. Service in a ship of war should be put in when the officer is young and ready to adapt himself to new surroundings. Expense is the only obstacle. Some shipowners might object to give leave. That difficulty should be met by the Admiralty paying a substitute. The midshipmen of the Royal Naval Reserve should not be put upon the list until they have passed an examination—which should not be too stiff—in theoretical subjects.

Fishermen eligible for Naval Reserve.

If the supply of seamen from the Mercantile Marine is falling away, the fisheries are flourishing. In this vast maritime industry a large body of hardy seafaring men are being reared up at no expense to the State. No training ships or subsidies to shipowners are needed in order to rear up fishermen. Their pay is liberal, the employment does not involve, as in the case of the over-sea trades, prolonged absence from home, and no foreigners are employed. The latest returns issued by the Board of Trade give the number of fishermen constantly employed at 66,700, and the number of those occasionally employed at 38,000. We have in the fisheries a reserve of seafaring men, from whom the auxiliary forces for the Navy might be recruited up to any strength which in the judgment of the Admiralty is necessary. The fishermen are always near at hand. In his speech at the annual dinner of the officers of the Royal Naval Reserve on March 4, 1896, Mr. Goschen specially referred to this important point:—"In old days, perhaps, it might have been said that the first-class reserve were those upon whom we should mainly rely; but since sails have ceased to play a part to so great an extent on the sea, the second-class reserve, composed of the sturdy fishermen round our coast, seem to me to be almost as valuable as the first-class reserve itself; and they have this advantage over their brother sailors—that they are near in the case of any emergency."

The efficiency of the fishermen as gunners will depend on the instruction they receive. The attention to drills, or the willingness to serve at sea in a ship of war, will be proportionate to the rewards offered in pay, promotion, and other advantages. Our fishermen are more particularly adapted by their sea habits for service in small ships.

Colonial Naval Reserve.

The fishing industry is a nursery for seamen, not only in our home waters, but in parts of the Empire beyond the seas. The fisheries under the British flag in Canadian waters give employment to some 50,000 hardy seamen. I recognised the importance of the Canadian fisheries as a recruiting ground for the reserves when cruising in the Gulf of St. Lawrence, thirty years ago. I had been

pushing forward suggestions for the enrolment of fishermen in the Royal Naval Reserve at home. It was clear that a similar force could be raised in Canada. The advocacy of this policy, begun in lectures and pamphlets, was followed up in the *Naval Annual.* It was discouraging to work for many years with no success. After a prolonged consideration by successive Boards, Mr. Goschen at length announced to a deputation of the Empire League that the services of colonial naval reserve men would be gladly accepted.

The first enrolment of a colonial naval reserve was made in Canadian waters. The experimental training of fifty reservists from Newfoundland in H.M.S. Charybdis has been highly encouraging. After six months' service on a winter cruise in the West Indies, Commodore Gifford reported to the Newfoundland Government as follows: "We all consider them to be now a useful and efficient body of men who would be a formidable addition to our *personnel.* So well have they done that I have been able to advance forty to the higher rating, qualified seamen." On their return home the volunteers were received with an ovation by the population. The advantages of naval training were evident in the improvement of the volunteers in intelligence and physical condition. The movement for the enrolment of a naval reserve has caught on in Newfoundland. The arrival of the Calypso, which has been fitted as a trial ship, will strengthen the movement already so well begun.

While Australia cannot rival Canada in the numbers of her maritime population, the island continent has more than 38,880 seafaring men, and they are of a class which has attained to a level of prosperity unhappily rarely seen amongst those who follow the sea. The crew of the Sunbeam on her recent voyage of 20,000 miles from Melbourne to England was the best crew we have ever had in that vessel.

When the offer to enrol volunteers was conveyed to the Australian Governments through the Commander-in-Chief in Australia, consideration was promptly given to the subject in the colony over which I had the honour to preside. Captain Tickell, of the Victorian Navy, was instructed to visit all the ports and fishing villages on the coast, and to ascertain how far the terms offered would be accepted by seafaring men. As might have been expected, the rates of pay, which under the regulations proposed did not differ materially from those established for the force at home, were not found sufficient when measured by the colonial standard. The difficulty would be most serious when reservists were called upon to serve for six months continuously on a ship of war.

It was clear that some modification must be proposed to meet the

conditions with which we have to deal in Australia. At their meeting in Melbourne for the final consideration of the Commonwealth Bill, the Premiers of the Australian colonies directed the naval commandants of the several colonies to consider an alternative plan for submission to the Admiralty. The naval commandants—the majority being retired officers of the Royal Navy—assembled at Sydney. After a lengthened consideration they issued a report, which has been criticised as indicating a desire to create an independent navy for Australia. No such plan was in contemplation. It was clear that well-paid colonial seamen could not be expected, at a serious sacrifice, to put in six months' service on board a ship of war. The commandants therefore recommended, as a plan more adapted to colonial conditions, that the naval volunteers should be drilled throughout the year in harbour, going to sea at frequent intervals for short cruises for gunnery practice. For the better carrying out of this plan of instruction they proposed that application should be made to the Imperial Government for the loan of cruisers of modern type, to be manned and maintained at the expense of the colonies, and to be used as sea-going gunnery ships for the training of the Colonial reserves.

These recommendations contained no covert design to create a navy free from Imperial control. Sooner or later it will be the duty of the Commonwealth to give further aid in the naval defence of the Empire. If, as may be expected, that aid should be given by the creation of a local navy, we may be assured that while the present loyal feelings remain—and why should they not endure for all time?—the vessels will be available for combined operations under the direction of Imperial officers.

Royal Naval Artillery Volunteers.

And now let us turn to those auxiliary forces of the Navy which can be recruited from the amphibious classes of the population. In the Great War they gave us a sea militia known as the Sea Fencibles; they filled up the crews of our wooden line-of-battle ships. In a volume published in 1862 on the navies of France and England, it was estimated by Monsieur Xavier Raymond, a well-known authority, that if England applied to all her population who lived by the sea the laws of the French Inscription Maritime, she might reckon on 700,000 or even 800,000 men. With a view to make these vast resources for recruiting available for the reinforcement of the Navy, in 1873 a movement was set on foot in the City of London which resulted in the enrolment of the Royal Naval Artillery Volunteers. I had the privilege of being actively associated with those first efforts. Nineteen years later the force was disbanded, for no sufficient cause. The volunteers were smart and

intelligent gunners and good oarsmen. When embarked in gunboats for the annual cruises they efficiently performed their duties. Their conduct was exemplary, their zeal unflagging. The volunteers were annually inspected by the Admiral Superintendents of the Reserve—Sir Walter Tarleton, Admiral Phillimore, and the Duke of Edinburgh. The reports of those distinguished officers, as of the lieutenants commanding the gunboats, were most satisfactory. The volunteers were not content merely to do the drills required; they formed sailing clubs; they purchased a large dockyard hoy—a heavy cutter-rigged vessel—and, without professional assistance, successfully navigated throughout the summer season, and often at night, between Gravesend and Spithead. It was a most creditable performance; it showed not only enthusiasm, but a skill in pilotage of no mean order. The commanding officer of the London brigade was the owner of a schooner yacht, which was navigated, without any professional men on board, to the coast of Portugal and to the Azores. *On a toujours les défauts de ses qualités.* The naval volunteers were too anxious to be rated as pure bluejackets. It created difficulties for the Admiralty.

How to be employed.

The volunteers may be looked upon as essentially a reserve to the Marines. They should be fully capable of doing any of the duties of Marines on board ship. Large numbers are required to supply ammunition to quick-firing guns, only a small proportion of whom require special skill; though all need discipline. That should not be wanting in a well-trained naval reserve, recruited from a class of superior intelligence, and full of patriotism. Volunteers could be employed as trained signallers and telegraphists. Naval manœuvres have shown there is a scarcity of signal ratings on board our ships, which the casualties of war are likely to render excessive. Skilled mechanics could be enrolled in a naval volunteer force; they would be available as a reinforcement to the permanent men for electrical and hydraulic work.

Movement revived.

The hard experiences of recent years have taught us many lessons. We should not now, in these times of stress and strain, pour cold water on patriotic aspirations. It has been intimated that the present Board of Admiralty are favourable to the re-enrolment of a force on the lines of the Royal Naval Artillery Volunteers. The action thus far initiated by the Admiralty has been received with the warmest approval in all the principal ports. Learning a lesson from the experiences of the past, the volunteers will do well not to criticise the regulations and conditions which the Admiralty may lay down. They will accept an engagement to serve in every quarter of the globe in any capacity for which the Admiralty may consider them

to be qualified. I cannot close without a tribute of praise to Mr. Chadwyck-Healey and other members of the disbanded force, who are doing so much earnest and good work in promoting the present movement of revival.

Naval Volunteers in United States.

Experience of the exigencies of war has impressed the Naval Administration of the United States with the value of a force similarly constituted to those Royal Naval Artillery Volunteers which were too hastily disbanded. The report of the Secretary of the United States Navy for 1898 is of particular interest in connection with proposals for the enrolment of volunteers for service in the Navy. When the war with Spain broke out it was found necessary, both for coast defence and to provide crews for auxiliary vessels, to make a large increase in the enlisted force. The only additional trained men available were the officers and men of the Naval Militia, who had been armed and equipped and given a certain amount of training in the line of defence of the shores and harbours of their several States. Leave of absence having been given by the Governors, about 4000 officers and men were added to the enlisted force of the Navy. They were assigned to duty in the auxiliary naval force, in the coast signal service, and on board of cruising ships, some of which were entirely officered and manned by the Naval Militia, with the exception of the commanding, executive, and navigating officers. The Secretary of the United States Navy gives high praise to the sea militia. "These organisations," he says, "were largely recruited outside of the seafaring class. They lacked the experience in gunnery, navigation, and the habits of the sea, which are essential to the immediate service in the Navy. On the other hand, they were men of a high standard of education and intelligence, and rapidly acquired while on board ship the knowledge necessary for their efficiency. Considering their lack of experience, the services rendered were most valuable; the country has been amply repaid for the money expended in their instruction and training." He further remarks: "The officers and men who were specially charged with the duty of coast defence displayed perfect aptitude for the work connected with patrol duty, owing to their intimate knowledge of home waters."

In his report for 1900, the Secretary of the United States Navy recommends the organisation of a Naval Reserve on a more comprehensive scale than heretofore. "Although the seafaring class of our people are a comparatively large number, they are now brought into touch with the naval service and the Naval Department in time of peace in such a manner as to instruct and prepare any part of it for assistance to the regular service in case of a sudden outbreak of war. Means should be provided to this end, and

the matter should receive the immediate attention of Congress, and provision be made for enrolling, in addition to the Naval Militia—which is an organisation of the States, and under their regulation—a Naval Reserve of a national character." No special provision has been made for the Naval Reserve. It is highly desirable to efficiency.

Training of officers.

In conclusion, we have to deal with the training of officers. In comparison with Continental countries, little has been done by the British Government for nautical education. An excellent combination of theoretical and practical training for officers is afforded to the cadets of the merchant service at Liverpool and elsewhere, in excellent schools ashore, as well as on board those well-known schoolships the Worcester and the Conway. While the professional education is begun satisfactorily, adequate provision has not yet been made for training at sea. As an example of the kind of training which it is desirable to extend, and for which, in view of naval reserve requirements, the Admiralty might with advantage give their co-operation, a practical and successful experiment may be briefly described. At the instance of the parents and friends of boys on board the Worcester, I purchased two sailing ships, the Hesperus and the Harbinger, trading to Australia, and with the assistance of Messrs. Devitt & Moore a complete system of training was organised. The boys were treated as in the gun-rooms of H.M. ships. They were taught practical seamanship and took their part in working the ship. Navigation was taught by retired naval officers, appointed to each ship as instructors. The commanders were responsible for discipline. The advantages offered in the Hesperus and the Harbinger were appreciated. The ships were always full. The boys were of the class from which the officers of the Royal Navy are recruited. On completing their training they never failed to get employment in the best services in the Mercantile Marine. The Hesperus and the Harbinger were not adapted for competition with ships of more modern type. They were sold with regret. Messrs. Devitt & Moore are carrying on the work thus commenced in their fine ships, the Illawara and Macquarie, of 1900 tons, well known in Sydney Harbour. Each carries forty cadets.

Subsidies to shipowners.

I strongly recommend that subsidies should be paid to shipowners for the training of officers under engagements to serve in the Royal Naval Reserve. A premium of £100 for each midshipman of the reserve who, on the completion of four years' training, could pass for lieutenant would give encouragement to undertake the work, while the cost to the State would be inconsiderable in comparison with the expenditure incurred on board the Britannia.

A merchant navy cannot, without help from the Government, supply officers with the varied attainments which in the Royal Navy are acquired by long and elaborate instruction. To bring a reserve fully up to the level of a permanent force is neither necessary nor feasible. Much may, however, be done, and at a moderate cost to the State, to extend the limited opportunities of training for officers at present available. The Germans are setting an example which we should do well to follow.

If our fleet were mobilised for a serious and a prolonged struggle, we should be very ill-prepared to meet the demand for officers. Immense numbers would be required. In the American Civil War no less than 7500 officers from the Mercantile Marine were employed in the Navy of the North. The Secretary of the United States Navy spoke in the highest terms of their gallantry and devotion. But they were without previous training. It was necessary to establish schools for their instruction in the rudiments of gunnery and naval discipline. Such improvised arrangements cannot be as satisfactory as those carefully organised in peace.

Owing to the rapid reinforcement of our Navy in ships and men, a call on the Mercantile Marine was lately made for supplementary lieutenants. One hundred in the first instance, and subsequently fifty more, received appointments.

Strength of the Naval Reserve.

It remains now to consider the number to which it is desirable that our naval reserves should be raised. We must keep in view the demands for a fleet to which we are year by year making large additions. We must look to the strength of other Powers. The Inscription Maritime gives to France about 114,000 men, of whom 25,000 are serving with the fleet, and 50,000 are considered as fully effective for sea service. In Russia and Germany conscription will always furnish large numbers, which we can only get by voluntary enlistment. Any standard of strength at which the Royal Naval Reserve may be fixed is more or less arbitrary. We shall hardly be going too far in fixing the strength of the British reserves as under:—

Royal Fleet Reserve	15,000
Royal Naval Reserve	30,000
Colonial Reserves	20,000
Naval Volunteers	20,000
Stoker Reserve	20,000
Total	105,000

Increased expenditure

The numbers proposed are not more than sufficient to keep our strength at a standard of equality to a combination of two foreign Powers. As a naval Power Great Britain would hold a more

commanding position with 100,000 men in reserve for manning the Navy. The charge for a reserve would be light in comparison with that incurred in the last ten years for the growing numbers of permanent men. It is, of course, impossible to create a reserve as strong and as well trained as this country requires without an adequate—that is to say, a liberal—expenditure. We have voted money freely for the permanent force. We have starved the reserves. In the last eleven years we have increased the permanent force by 55,000 men. The vote for Navy pay has risen from £3,564,000 for 1892–1893 to £6,079,000 in 1902–1903, and the vote for victualling and clothing from £1,475,000 to £2,513,000. In addition, we shall have to meet the increase of charge, which must come automatically from the increase of numbers, for the non-effective vote. What have we been spending in the interval on the reserves? In 1892–1893 the vote under this head was £159,000. In 1902–1903 the amount is £287,000—a scanty appropriation in a total of over £32,000,000. The difficulties, so far as they exist, in raising naval reserves in the colonies are all due to the want of means—that is to say, to the scanty appropriations to the reserve forces of the Navy.

Staff of the Naval Reserves.

It is essential to the efficiency of the reserves that a flag officer should be appointed for their supervision. He might be selected, with his staff, from the Retired List. There is much to be done in the way of organisation. The Colonial Reserves and the Royal Navy Artillery Volunteers are new forces. In the initial stages difficulties are certain to arise. Stirring speeches may be wanted; prudent despatches must be written to commanders-in-chief for the consideration of Ministers in the colonies. The susceptibilities of volunteers should be tactfully dealt with. Frequent inspections of scattered forces are required. The charge of the Coastguard and the Reserve Squadron now constantly at sea is a sufficient responsibility for the distinguished officer who at present holds the appointment of Admiral Superintendent of the Reserves.

It is desirable to increase the strength of the reserves, and to draw from new sources both at home and in the colonies. No progress—scarcely a beginning—will be made until an officer has been appointed to the command who, by his high standing in the service, will carry weight with the Admiralty and exercise authority over the volunteers.

The organisation of reserves has at last been taken in hand seriously by the Admiralty. As a first step a strong committee has been appointed, including Admirals Sir Edward Seymour and Henderson, Commodore the Hon. Hedworth Lambton, Sir Francis

Mowatt (representing the Treasury), and Mr. Clark Hall (Registrar-General of Seamen), with Sir Edward Grey as chairman. The committee is asked to report on the means of recruiting, and as to the duties which should be assigned to men of the reserves. We may now look with confidence for a comprehensive and well-considered plan of mobilisation, under which the reserves will take a defined and an important part.

BRASSEY.

CHAPTER V.

British Naval Manœuvres.

Programme. The following was the programme of the manœuvres of 1901:—

GENERAL IDEA.

The manœuvre area lies between the 56th and 47th parallels.

Fleet B is cruising in the North Sea, and can coal at Plymouth, Portland, or Portsmouth. It has detachments of cruisers and torpedo craft at Plymouth, Portland, and Portsmouth.

Fleet X is cruising off the north coast of Ireland, and can only coal at Queenstown or the Scilly Islands. It has detachments of cruisers and torpedo craft at the Scilly Islands and the Channel Islands, which can coal at those places.

The whole of Great Britain below the 56th parallel belongs to B.

The whole of Ireland, together with the Scilly Islands and Channel Islands belong to X.

The orders from the Admiralty to commence hostilities do not necessarily reach both sides at the same time.

The following ports are fortified and are placed in a state of defence:—

In Great Britain.

Portsmouth.
Portland.
Plymouth.

In Ireland.

Queenstown.

All other ports are unfortified, except the Scillies, Alderney, and Guernsey, which, together with the vessels in those ports, are to be considered proof against attack by vessels of any description.

The examination service is to be brought into operation at Portsmouth, Portland, Plymouth, and Queenstown, but is only to be made applicable to ships of war; merchant ships are not to be interfered with.

Each fleet is to try to obtain the command of the English Channel, and of the approaches both to it and to the St. George's Channel, X's ultimate aim being to stop the trade in those waters, and B's to cover it.

It will be convenient to append here so much of the General Orders and Instructions as are necessary to a clear understanding of the situation contemplated in the general idea and the programme based on it. These were as follows:—

GENERAL ORDERS AND INSTRUCTIONS.

The vessels specially commissioned for the manœuvres will be attached to the Coastguard and Channel Squadrons. They will assemble as soon as ready at Portland and Torbay respectively, and will be formed into two fleets, to be known as Fleet B and Fleet X respectively.

Four special squadrons composed of cruisers, torpedo gunboats, and torpedo craft will be formed. Two of these, known as Squadrons C and D, will be attached to Fleet B, and will assemble at Portland. The other two, known as Squadrons Y and Z, will be attached to Fleet X, and will assemble at Torbay.

The bases of these special squadrons during hostilities will be:—

Squadron C	Plymouth.
Squadron D	Portland and Portsmouth.
Squadron Y	Scilly Islands.
Squadron Z	Channel Islands.

At the time appointed the main fleets will proceed to sea for the preliminary cruise, during which the ships of each fleet will be exercised and anchored at the discretion of the Admiral in Command.

On the same day the special squadrons will proceed to sea independently for a preliminary cruise, during which each squadron will be exercised and anchored at the discretion of the Senior Officer.

No vessels, except destroyers and torpedo boats, are to coal after July 21 until hostilities commence.

The dates for the commencement and termination of hostilities will not be made known beforehand, but they will not begin before midnight, July 28–29. After that hour the order to commence hostilities may be expected at any time. Both battle squadrons, which are to include all battleships, accompanied by such cruisers and smaller vessels as the Admirals in Command consider it desirable to keep with the main fleets, are to be at sea at that hour and date, to the northward of the 56th parallel, Fleet B in the North Sea, and Fleet X to the west of Scotland. Both fleets are then to cross the 56th parallel and enter the manœuvre area.

The special squadrons are to be at their bases at midnight, July 28–29, after which they will be at liberty to put to sea, in accordance with such orders as they may have received.

On the conclusion of the manœuvres, the ships and vessels will proceed to carry out target practice, separately in the case of the mobilised ships, ample time being allowed for the careful performance of the practice; in the case of other ships, separately or in company, at the discretion of the Admiral in Command.

There appears to be no very definite strategic purpose indicated by the positions here assigned to the two main fleets at the time immediately antecedent to the outbreak of hostilities. If a contest is imminent for the command of the seas adjacent to the Land's End, it is not at all likely that the two fleets engaged in it would be found cruising to the north of the 56th parallel at a time when war might be declared at any moment. This might happen, of course, in certain contingencies, if the Land's End were taken to represent either Gibraltar or the Skaw, but the other features of the situation present no very close analogy to either of these hypotheses. It might, however, happen in many parts of the world that two hostile fleets might at the outbreak of hostilities find themselves at such a distance from their respective bases that neither could venture to go into action without replenishing its bunkers; and though this could hardly happen in the case of two fleets, one of which was a British fleet, contending for mastery at the entrance to the Channel, yet, the situation being a possible one in other parts of the world, the experience and instruction to be derived from it may very legitimately be sought by means

Comments thereon.

of a strategic convention not altogether congruous with the local conditions involved. Be this as it may, the leading idea is that of a conflict for the command of certain waters—the historic waters known as "The Sleeve" and "The Soundings" to our older mariners —between two fleets very evenly matched in their main bodies, and very equally supplied with forces auxiliary to the line of battle. Stress must be laid on this approximate equality of force. Opinions may differ as to whether eight battleships of the Majestic and Royal Sovereign classes are or are not superior in aggregate fighting capacity to twelve other battleships, nearly all of earlier date, of a collective speed lower by at least two knots, of armour, armament, and structure less modern, and therefore presumably less efficient than those of their adversaries. But this question was not really in issue between the two sides. It was decided beforehand by the Admiralty, who must have assumed that the B fleet was capable of holding its own with a fair chance, though, of course, with no certainty of victory, against the X fleet, when they laid upon it the task of contending with its adversary for the command of the seas in dispute. If this assumption was at variance with "what would be probable in war," the whole scheme of the manœuvres was to that extent vitiated *ab initio*. There can be no contest for the command of the sea between two fleets, one of which is incapable of meeting the other in the open with any prospect of victory. The fact that there was to be such a contest must be taken to imply that in the judgment of the Admiralty the two fleets were approximately equal in aggregate fighting capacity.

Comments continued. "Each fleet is to try to obtain the command of the English Channel, and of the approaches both to it and to the St. George's Channel, X's ultimate aim being to stop the trade in those waters, and B's to cover it." A distinction is here implied between the ultimate aim of each side and its immediate and primary aim. This must clearly be "to obtain the command" of the waters in question. There is only one way of doing this, and it is clearly defined in the official programme of the manœuvres of 1900: "Each fleet will try to obtain the command of the sea, that is to say, will endeavour to defeat the other, to shut him up in his ports, and especially to clear the sea of his torpedo craft." In order to obtain the command of the seas specified to be in dispute, one of two fleets—the B fleet and the X fleet—must either defeat the other or shut him up in his ports; and must further endeavour to clear the sea of his torpedo craft. Until this was done by the X fleet the ultimate aim of "stopping the trade" could not be undertaken, or at any rate could not be fully attained; if, on the other hand, it could be done by the B fleet, the

ultimate aim of "covering the trade" was *ipso facto* accomplished. Neither fleet could therefore be adjudged to have done what it was required to do until either it had encountered its adversary and defeated him, or had shut him up in his ports. There is no way of obtaining the command of the sea except by fighting for it. An admiral who declined to fight for it, because he chose to assume that a numerically inferior fleet was tactically more than his match, would undoubtedly in time of war incur the fate of Matthews, if not that of Byng.

The B fleet not inferior to the X fleet.

It is expedient to insist on the foregoing at the outset, because the view is both prevalent and at first sight plausible that such a fleet as the B fleet could never have held its own against such a fleet as the X fleet, and ought for that reason never to have been pitted against it. It is not proposed to examine this view here. It is sufficient to repeat that it could not have been entertained by the Admiralty when the programme of the manœuvres was drawn up. But one general remark may be made. The strength of a manœuvre fleet is not determined by the same considerations as those which would determine the strength of a fleet sent out to encounter a hostile fleet of strength approximately known in time of war. In that case the Admiralty would have to see to it that, so far as the resources at their disposal might permit, the British fleets engaged should always be in a position to meet the enemy on terms unquestionably equal in all essential respects, if not on terms appreciably superior. The stake is so great, the issues are so momentous, that nothing must be left to chance. But in manœuvre fleets a substantial equality between the two sides is much more conducive to the profitable study of the problem involved. There is no lesson to be learned from a purely make-believe conflict between two fleets, one of which is demonstrably and avowedly incapable of meeting the other in action; nor is it just to an admiral to place him in so humiliating a position. Hence the strength of two fleets engaged in manœuvres must be so proportioned as to give each side a fair chance, but no certainty of victory over the other. There is no question here of "what would be probable in war." That question can only arise at a later stage of the proceedings. If it were probable that this country would have to encounter its adversaries at sea on no more than equal terms, our naval supremacy would be little better than a phrase. It will never do to stake the very existence of the Empire on the chance that "Providence and a good admiral" will always be on our side. Good admirals are just as likely to be found on one side as on the other, and the favour shown by Providence to big battalions is proverbial.

Composition and command of the fleets.

The fleets were composed as follows :—

FLEET X.

Main Fleet.

MAJESTIC.
MAGNIFICENT.
PRINCE GEORGE.
JUPITER.
HANNIBAL.
MARS.
RESOLUTION.
REPULSE.

DIADEM.
NIOBE.
HAWKE.
IMMORTALITÉ.
NARCISSUS.

FURIOUS.
ARROGANT.
MERSEY.
RAINBOW.
RETRIBUTION.
PELORUS.
PACTOLUS.
GLEANER.

Destroyers (from Devonport) :—

LEVEN, LOCUST, THORN, VIGILANT, LEOPARD, GIPSY, TIGER, OSPREY.

Squadron Y.

Base. Scilly Islands.

BRILLIANT.
ÆOLUS.
SHARPSHOOTER.
JASON.
HECLA.

Destroyers (from Chatham) :—

LEE, CYNTHIA, STURGEON, CHEERFUL, DESPERATE, ANGLER, SALMON, MALLARD.

Torpedo Boats :—

Nos. 58, 66, 76, 98.

Squadron Z.

Base, Channel Islands.

THAMES.
IRIS.
IPHIGENIA.
INTREPID.
SEAGULL.
SHELDRAKE.

FLEET B.

Main Fleet.

Revenge.
Sans Pareil.
Howe.
Nile.
Trafalgar.
Benbow.
Anson.
Camperdown.
Collingwood.
Colossus.
Edinburgh.
Dreadnought.

Amphitrite.
Ariadne.
Edgar.
Galatea.
Impérieuse.

Minerva.
Hyacinth.
Forth.
Andromache.
Apollo.
Pandora.
Fox.
Latona.
Onyx.

Destroyers (from Portsmouth) :—

Peterel. Kestrel. Chamois. Kangaroo. Crane. Vulture. Fawn. Myrmidon.

Squadron C.

Base. Plymouth.

Spartan.
Sirius.
Skipjack.
Renard.

Destroyers (from Devonport) :—

Bat. Fairy. Shark. Opossum. Wolf. Panther. Fervent, Lynx, Zephyr.

Squadron D.

Base. Portland and Portsmouth.

Melampus.
Mercury.
Prometheus.
Severn.
Scylla.
Leda.
Speedwell.

FLEET X.—*continued.*

Destroyers (from Chatham):—

MERMAID, ZEBRA, AVON, BITTERN, SPITFIRE, ALBATROSS, SNAPPER, HAUGHTY, PORCUPINE, ARIEL, CONTEST, DASHER.

Torpedo Boats:—

Nos. 55, 79, 81, 82, 85, 86.

Under Rear-Admiral, Queenstown.

CURLEW.
SEAHORSE.*
STORMCOCK.*

FLEET B.—continued.

Destroyers (from Portsmouth):—

Spiteful, Starfish, Viper, Havock, Brazen, Dove, Wizard, Violet, Electra, Teazer, Surly, Sylvia, Hunter, Charger, Bullfinch.

Under C.-in-C., Plymouth.
For Plymouth.

Antelope.
*Traveller.**
*Tay.**

Torpedo Boats:—

Nos. 45, 52, 53, 54.

Under C.-in-C., Portsmouth.
For Portland.

*Spanker.**
*Spey.**

Torpedo Boats:—

Nos. 26, 27.

For Portsmouth.

Circe.
*Magnet.**
*Raven.**
*Landrail.**
*Trent.**

Torpedo Boats:—

Nos. 41, 42, 49, 50.

The X fleet was commanded by Vice-Admiral Arthur K. Wilson, C.B., V.C., senior officer in command of the Channel Squadron, with Rear-Admiral Sir William A. Dyke Acland, Bart., as his second in command; their flags flying respectively in the MAJESTIC and the MAGNIFICENT. The B fleet was commanded by Rear-Admiral Sir Gerard H. U. Noel, K.C.M.G., Admiral-Superintendent of Reserves, with Rear-Admiral Harry T. Grenfell, C.M.G., as his second in command; their flags flying respectively in the *Revenge* and the *Sans Pareil.*

The following were the "Rules and Regulations to be observed during the manœuvres":— Rules.

No rules setting forth the conditions under which ships will be put out of action will be issued. Each case must be decided by the Umpires on its merits on the basis of what would be probable in war.

When two or more ships come into action the commencement of the engagement is to be marked by the firing of a gun by one of the ships engaged. During the engagement single guns are to be fired at about one minute intervals by the ships engaged.

When either side considers that he has beaten the other, he should signal, "Propose reference to Umpires." If the other agrees to the reference the action is to cease. If the other does not agree the action may continue, but not for more than a reasonable

* For examination service.

time, which is to be determined by the Senior Officer present. A reasonable time under ordinary conditions would be one hour in the case of battleships, cruisers, and torpedo-gunboats, and half an hour in that of destroyers and torpedo boats.

When reference to the Umpires has been settled, the Senior Officer present is to determine what ships on either side are to proceed into port to await their decision, pending which the ships detached are to be considered out of action. The Senior Officer present must take care to select as far as possible equally from both sides.

If a ship is undoubtedly torpedoed, or manifestly overpowered by a much superior force, the Senior Officer present may take the responsibility of temporarily putting such ship out of action and ordering her into port for the decision of the Umpires. In this case it will not be obligatory to order into port a ship from the opposite side.

Ships put out of action can take no further part in the manœuvres, but must return to one of their base ports—Queenstown, Scilly, Alderney, Guernsey, Plymouth, Portland, Portsmouth—flying the Blue Peter at the fore. They are to select a route as far as possible clear of the scene of operations, and are strictly enjoined not to communicate any information to the ships on either side which they may meet on the way.

Colliers are not open to attack at sea.

Signal stations are not open to attack by landing parties.

As the 18-inch torpedo cannot be fired at a ship in a peace exercise, a destroyer is to fire a blue light by night or blow her whistle by day at the moment when the torpedo would be discharged, the tube being trained and all adjustments made as if actually firing.

Torpedoes fitted with collapsible heads may be fired at battleships and cruisers, but not at torpedo gunboats, destroyers, or torpedo boats.

Torpedo boats are not to paint out their numbers.

Care should be taken not to expose vessels needlessly to fire from forts.

The limits of those ports which are considered proof against attack are as follows:—

Alderney.—A line drawn from the submerged end of the breakwater to the northern extreme of Château à l'Etoc.

Scilly Islands.—A line drawn from Menewetham through Newfoundland Rocks, Horse Point, Annet Head, Castle Bryer, Crow Point, Guthers Island, to Menewetham.

Guernsey.—A line drawn from Jerbourg Point to the southern extreme of Serk, and another line drawn from the northern extreme of Serk to the northern point of Herm and thence to Doyle Point.

During the operations ships are not to pass the limits of the manœuvre area, and are not to enter foreign territorial waters.

Umpires.

The following officers were nominated to act as umpires: Vice-Admiral Sir Robert Harris, K.C.B., K.C.M.G., Rear-Admiral James L. Hammet, and Rear-Admiral Sir Baldwin Walker, Bart., C.M.G. Their instructions were of the usual character, and need not be set forth at length. Lieut.-General J. F. Owen, R.A., was appointed by the War Office "to act as military umpire, to decide, jointly with the naval umpires, claims arising between the land defences and the ships." Very few such claims seem to have been preferred, and no reference was made to them either in the "narrative" of the proceedings issued by the umpires shortly after the operations were concluded, or in the report recently presented to Parliament.

Comments on the "General Idea."

There are one or two features of the "General Idea" which invite comment at this point. The two contending fleets were, as has already been pointed out, very evenly matched except in one important respect. To the X fleet were assigned two impregnable bases, one in the Scillies and the other in the Channel Islands, which were "to be considered proof against attack by vessels of any description." To the B fleet three bases were assigned, Portsmouth, Portland, and Plymouth; but these ports were declared to be not impregnable, but

"fortified and placed in a state of defence." In other words, ships lying in any of them were open to attack at all times if the attacking force thought itself strong enough to withstand the fire of the fortifications, or cunning enough to elude the observation of the defence. In these conditions Spithead became untenable, while Portsmouth Harbour, which ought to be, and probably is, impregnable so far as fixed defences can make it so, could only accommodate a small detachment of the B fleet. Portland, on the other hand, could and did accommodate the whole fleet, though some of the smaller craft had to be berthed outside the protection of the breakwaters; and possibly Plymouth could have done the same, though the security of Plymouth Sound against a well-planned and hard-pressed attack by torpedo craft is not unimpeachable, as was shown by the memorable experience of the late Sir George Tryon in 1890. The result of these conditions was that Portland alone was used as a base by the main body of the B fleet, and that even there, though lying in a fortified port, it had to make provision for its own defence in case of attack, while every ship which entered had to submit to the delays of the so-called "examination service," a service which involved a large element of make-believe and some risk of confusion. A better organised and more intelligent system of co-ordination between the naval and military arms in the defence of a naval port is still very much to be desired. No official information on the subject appears to be accessible, but, if the reports of correspondents are to be trusted, there is no branch of our national system of defence which is so chaotic in its organisation and so unintelligent in its methods. Anyhow, the X fleet was troubled with none of these difficulties, delays and alarms. Once safely ensconced within the conventional limits of its impregnable bases at the Scillies and the Channel Islands, it had no sort of attack to anticipate or fear. There was no "examination service" to delay the entry of its ships, possibly hard pressed by an enemy in superior force, and any hostile vessel which transgressed the prescribed limits was *ipso facto* put out of action—as the *Hyacinth* was at the Channel Islands—without putting its adversaries to the trouble of firing a shot. The umpires must have been hard put to it to reconcile such a proceeding with "what would be probable in war."

The scene of the operations.

Another point which deserves notice is the locality selected for the incidence of the main stress of the operations—a region within which nearly all the trade routes leading from the Atlantic to the British Islands and the North Sea converge, and ultimately coalesce into two or three congested and almost continuous streams of traffic. This was a bold innovation, but a well-advised one. It was directly

founded on "what would be probable in war." Nothing is less probable in war than that two hostile fleets should operate for days in that unfrequented region of the Atlantic which is bounded by the northern and southern trade routes round Ireland. Fleets will operate in war either where the trade can best be stopped or covered, or where one side or the other can best secure a strategic advantage by combining its divided forces. In other words, they will operate, so far as the Atlantic is concerned, either within the great strategic line which stretches from Cape Finisterre to Cape Clear, or within the adjacent region which is bounded by a line drawn from Cape Clear to Cape Spartel. And inasmuch as the main object of a British fleet must always be to "cover the trade," to keep the maritime communications open—even though that object can only or best be attained by the destruction of the enemy's fleet—it is expedient that British fleets should be trained in peace to operate in crowded waters with safety. Hitherto the risks involved in such proceedings appear to have been thought too formidable to face. They have been faced at last, and found to be not formidable at all. No single merchant vessel was incommoded by the operations, and such mishaps as befel His Majesty's ships were in no way caused by the congestion of traffic in the Channel.

Destroyers on both sides.

A third point is the fact that large contingents of destroyers were for the first time assigned to both sides. This again is fully in accord with what would be "probable in war." Whether the use made by each side of its destroyers was equally well founded on a sound appreciation of the conditions and requirements of actual war is a question raised by the operations, but by no means exhausted by them. If a destroyer is used as a torpedo boat, it ceases to be a destroyer. It may be put to a better use, but it is not put to the use for which it was designed and brought into existence. If it is used as a cruiser, it equally ceases to be a destroyer. To use it as either is practically to declare that the menace of the mere torpedo boat may safely be neglected. In that case the specific function of the destroyer is in abeyance, and it becomes either a superior type of torpedo boat or an inferior type of cruiser. In the former alternative the true answer to it would seem to be, not the passive and fugitive defence which found favour in the recent operations, but such an active and aggressive defence as the late Admiral Long conducted so successfully in the manœuvres of 1891. In the latter alternative the destroyer would seem to have no valid reason for existing. With a limited range of observation, a limited radius of action, and habitability none of the best, it is a very indifferent scout, and as a commerce destroyer of little or no account. But the further

discussion of this point will be more profitably pursued at a later stage of the operations.

"Each fleet is to try to obtain the command of the English Channel, and of the approaches both to it and to the St. George's Channel." That is the primary object assigned to both sides. In order to accomplish it they must come to close quarters. Hence, as each fleet must desire to find and fight the other, it was obvious that, although placed at the outset of hostilities at great distances apart—one on the east side of Great Britain and the other on the west—they must both make for the region in which they would be most likely to come into contact, that is, for the western end of the Channel. But the conditions prescribed were such that the B fleet must necessarily coal by the way, and the X fleet would find it prudent, though not, perhaps, absolutely necessary to do so. Hence it was practically certain that the B main fleet would first make with all despatch for Portsmouth or Portland, and the X main fleet for the Scillies. But the cruisers on either side were not bound by the same rigid restrictions as the battleships. The latter must be north of the 56th parallel on either side of Great Britain at midnight, July 28–29, but they need only be "accompanied by such cruisers and small vessels as the admirals in command consider it desirable to keep with the main fleets." In other words, the cruisers attached to the main fleets, and not belonging to the subsidiary squadrons—C and D on one side, and Y and Z on the other, which were to be at their bases at midnight, July 28–29—might be disposed at the outbreak of hostilities in any position within the manœuvre area which their respective admirals might think proper to assign to them. As a matter of fact each side organised a large contingent of cruisers—Admiral Wilson keeping only the PELORUS in company, while Admiral Noel retained the *Impérieuse*, *Galatea*, *Forth*, and *Onyx*—and sent them ahead of its own advance to positions at the entrance to the Channel, there to operate as circumstances might require for the furtherance of the main object of the campaign on either side. The cruiser squadron detached from the X main fleet consisted of the DIADEM, NIOBE, HAWKE, IMMORTALITÉ, NARCISSUS, ARROGANT, MERSEY, RAINBOW, RETRIBUTION, and PACTOLUS, and was ordered to be 35 miles south of the Lizard at 7 a.m. on July 29, while the IPHIGENIA and INTREPID, belonging to the Z squadron, were ordered to leave the Channel Islands at midnight, July 28–29, and repair to the same rendezvous.

Conditions and requirements of the situation.

Thus Admiral Wilson lost no time in placing a very powerful squadron of cruisers at the entrance to the Channel. Admiral Noel was equally prompt, but his force was weaker and more dispersed.

Dispositions of cruisers.

The force he detached from the B main fleet consisted of the *Edgar*, *Amphitrite*, *Ariadne*, *Fox*, *Latona*, *Andromache* and *Pandora*, which were joined, on their way to a rendezvous ten miles south of the Wolf Rock, by the *Apollo* from Sheerness and the *Minerva* and *Hyacinth* from Plymouth. Thus the X cruiser squadron consisted of twelve ships in all and the B cruiser squadron of ten; but of the latter three were detached on the morning of July 29, the *Apollo* and *Fox* to reconnoitre Scilly and report results at Sennen Cove, one of the B signal stations, and the *Latona* to wait at Sennen Cove for the telegram from the Admiralty announcing the commencement of hostilities, which was sent out by the Admiralty at 8 A.M. and received by the *Latona* at about 9.30. The *Latona*, having received it, proceeded at once to the rendezvous, where she found the *Apollo*; the *Edgar*, with the main body of the B cruiser squadron, being at the time some miles to the westward, and out of sight owing to the hazy weather, and the *Fox*, which had not accompanied the *Apollo* to Sennen Cove, having rejoined at an earlier hour. By a singular but significant mischance the two opposing squadrons had passed each other unawares, the X squadron having reached a rendezvous to the eastward—35 miles south of the Lizard—and the B squadron having reached and passed a rendezvous to the westward ten miles south of the Wolf Rock. Hence, when the *Apollo* and *Latona* met at the rendezvous they found none of their consorts there or in sight, but observing a body of ships coming up from the south-east they stood towards them, only to find that they were the main body of X cruisers, ten in number, the ARROGANT and PACTOLUS having been detached to keep touch with Scilly. On discovering their mistake the *Apollo* and *Latona* attempted to escape, making for Plymouth, but they were chased, captured, and ordered out of action.

Cruiser action off the Land's End.

The B cruiser squadron had previously been dispersed to a distance of three miles apart for patrol and look-out purposes, its general line of advance being to the eastward. On hearing the firing between the *Latona* and *Apollo* and their assailants, the captain of the *Edgar* ordered his squadron to close, and altered course in the direction of the firing. His squadron was still more or less dispersed, however, when the enemy was first sighted and action was joined between the leading ships on each side. The X squadron also was in no very orderly formation after the chase of the *Apollo* and *Latona*, and we learn from the Parliamentary report that, as the weather was hazy at the time, neither side realised at first the full strength of the other. Anyhow, the action, which began in rather a haphazard fashion, ultimately became a general though rather confused one between ten ships of the X side—increased before its close to twelve

by the return of the ARROGANT and PACTOLUS—and only eight on the other. Its details, which displayed much tactical audacity and perhaps some tactical temerity, are too complicated for exposition without the aid of diagrams, for which no materials at once adequate and authentic are available. Its result was that all the eight ships of the B side and eight ships out of 12 on the X side—the DIADEM, NIOBE, HAWKE, NARCISSUS, ARROGANT, RAINBOW, INTREPID, and PACTOLUS—were temporarily ordered out of action. The final decision of the umpires was that the HAWKE, RAINBOW, and MERSEY were permanently out of action on the X side, and the *Ariadne, Fox, Andromache,* and *Pandora* permanently out of action on the other. Before the end of the day the B side sustained still further losses, the *Sirius* and *Renard,* of the C squadron, being adjudged permanently out of action as the result of an encounter with a superior force of the Y squadron. Early the next morning the *Spartan,* also of the same squadron, met with the same fate.

Remarks on the action.

The first 24 hours of hostilities thus resulted in heavy disaster to the B side. It had lost nine cruisers irretrievably, while its adversary had lost only three. As the task of the B fleet in "covering the trade" was necessarily more arduous and exacting than that of the X fleet in stopping it, and as the cruiser force of the two sides was approximately equal at the outset, this was manifestly a very grave disadvantage. But it was not wholly unavoidable. It is *primâ facie* bad strategy to place an important force in a position where it is liable to attack by a superior force of the enemy. The B cruiser force consisted only of ten ships at the outset, and of these two were detached at the critical moment and were overpowered in detail. The X cruiser force consisted originally of 12. Admiral Wilson had boldly and, as the event showed, wisely and most fortunately denuded his main fleet of all its cruisers but one. Admiral Noel, less happily inspired, had retained four cruisers in his company. Of these the three most effective—the *Impérieuse, Galatea,* and *Forth*—might easily have turned the scale on the morning of July 29. It is true they were of inferior speed to the rest of the squadron detached, but two of them—the *Galatea* and *Forth*—are respectively sister ships to the IMMORTALITÉ and MERSEY, both of which were placed by Admiral Wilson in the fighting line of his cruiser squadron. The B cruiser squadron must have been intended to be a fighting squadron, and not merely an observing one. As an observing squadron it was unnecessarily strong and injudiciously concentrated. As a fighting squadron it was not strong enough and was perhaps unduly dispersed when the enemy was encountered. It can never be wise to risk a large force for an incommensurate object, and there was no object to

be gained by placing a large fighting force in so advanced a position as the entrance to the Channel which would not equally require it to be there in overwhelming force. It is true that by sacrificing itself the B cruiser squadron paralysed the X cruiser squadron for a time, and thereby prevented it from making a rapid advance up the Channel and raising the close and effective blockade which had been established from the very outset against the Z torpedo craft at Alderney. But if that was the main object to be attained, it could have been attained without any such sacrifice. Indeed, it was very nearly not attained. It would have been no more bold a stroke of Admiral Wilson to send his main body of cruisers direct to Alderney than it was of Admiral Noel to send his main body of cruisers so far to the westward as the Land's End; and, as matters turned out, it would have been a much more politic stroke. We have already seen that the two forces passed each other altogether unawares during the night of July 28–29, so that the X cruisers had got to the eastward of the B. Had they pursued their easterly course without waiting for the news of the outbreak of hostilities—trusting to learn it from their consorts in the Channel Islands—the blockade of Alderney might have been raised and the Z torpedo craft released in time to attack the B main fleet in its advance through the Downs on the morning of July 30. On the other hand, though this was prevented at great cost by placing the B cruisers in inferior force so far to the westward as the Land's End, it might have been prevented with much greater certainty and much less cost by placing the B cruisers in superior force off the Channel Islands. They would there have been strengthened by the whole of the D squadron, and even if the lower speed of the *Impérieuse, Galatea,* and *Forth* was not sufficient to have taken them to the Land's End in the time allotted to that operation, it was certainly sufficient to take them as far as the Channel Islands before the X cruisers could arrive there. In other words, the whole object of the adventure which ended so disastrously off the Land's End could apparently have been attained at no risk at all off the Channel Islands if the B squadron of cruisers had been concentrated in full strength in that locality.

The FURIOUS and wireless telegraphy

Moreover, Admiral Wilson had with great foresight and sagacity placed the FURIOUS at the earliest possible stage of the operations in mid-Channel, off the Isle of Wight. She remained there unmolested, and indeed wholly unobserved, until she had ascertained that the B battle squadron had gone to Portland to coal on the evening of July 30. She intercepted the wireless signals made to and from the B fleet at the signal station of Culver, in the Isle of Wight, and found the cipher employed so simple that she was able to interpret it without

difficulty and communicate its character to Admiral Wilson when she rejoined him at Scilly. Had the B cruiser squadron been concentrated at the Channel Islands it seems hardly likely that she could have played this rather audacious game with impunity. The incident is also instructive for another reason. It shows that fleets and ships which use wireless telegraphy within the possible range of an enemy's vessels must always expect their signals to be intercepted and deciphered. They must, therefore, use a cipher which requires much time and labour for its interpretation. Admiral Noel seems to have neglected this rather obvious precaution, with the result that after the FURIOUS had detected his cipher his wireless messages were never broken up by his adversary, but taken in, deciphered, and turned to advantageous account. Admiral Wilson, on the other hand, was not so easily caught. His cipher never seems to have been detected by Admiral Noel. This cannot have been for lack of opportunity. The ARROGANT made a wireless signal to the X cruiser squadron on the morning of July 29 announcing the outbreak of hostilities. At the time this signal was made, the B cruiser squadron must have been between the ARROGANT and her consorts, and therefore well within the range of the signals made by the former. Yet the signals made by the ARROGANT were not broken up by the B cruisers, nor were they intercepted and detected by them. To have intercepted and deciphered them might have been difficult in the time. But it is not clear why they were not broken up. Possibly the captain of the *Edgar* thought it prudent not to disclose his presence prematurely. But in that case his caution availed him nothing in the end. In any case the whole series of incidents here detailed illustrates most instructively the difficulties that are certain to attend and the snares that are likely to beset the use of wireless telegraphy in time of war.

Advance of the main fleets.

The B main fleet crossed the 56th parallel going south at midnight on July 28–29, about 150 miles to the westward of St. Abb's Head, on the east coast of Scotland. The X main fleet crossed the same parallel at the same hour at about 30 miles to the eastward of the Island of Jura, on the west coast of Scotland. Both admirals received intelligence of the outbreak of hostilities on the following day, Admiral Noel about 5 P.M. from the *Onyx*, which brought it from Yarmouth, and Admiral Wilson a few hours earlier from the LEVEN, one of four destroyers which he had appointed to meet him—and which did meet him in spite of the fog which prevailed—at different points in his advance through the Irish Channel. The B fleet enjoyed fine and clear weather, but the X fleet was enveloped in fog before it reached its furthest point to the northward, and

never emerged from it until it had reached its anchorage at Scilly on the morning of July 30. In these untoward circumstances the finding of the fleet by the four destroyers above mentioned was a very creditable performance. Admiral Wilson had no serious attack to fear on his advance to the southward, as the speed of his fleet enabled him to pass the southern exit from the Irish Channel by daylight, and up to that point at any rate no hostile force was likely to be in his neighbourhood. But as it was practically certain that he would be between the Irish Channel and the Scillies during the night of July 29–30, it does not seem clear why, if destroyers are to be used as torpedo boats, some of the C destroyers stationed at Plymouth should not have been specially told off to look out for him in that locality and attack him if they found an opportunity. There were risks in such a course, no doubt, but there is no war without risks, and torpedo warfare is nothing but risks. The C destroyers were, as a matter of fact, employed at this period in keeping a watch on the Scillies, an occupation which might easily have afforded them an opportunity of attacking the X fleet with advantage. But the destroyer, formidable as its menace is, and profoundly as it influences the proceedings of fleets exposed to it, is curiously apt to be out of the way when it is wanted. There were at least five C destroyers off the Scillies on the night of July 29–30. At 6.30 A.M. on July 30 the whole of the X main fleet was within hearing of the fog-signals of the Bishop Rock. It is a significant illustration of the difference between the menace of the destroyer and its performance that, although the weather was so thick that the Bishop Rock could only be heard and not seen, the X fleet got into the Scillies unmolested, and the destroyers went away none the wiser.

The blockade of Alderney.

Admiral Noel was differently situated in his advance towards the Channel. There was a large force of hostile destroyers at Alderney, and these, if unmolested, could easily occupy the Downs and their neighbourhood in the North Sea in time to dispute the advance of the B main fleet. Accordingly a rigid blockade was very wisely established at the Channel Islands from the very outset of the proceedings. The force which conducted this blockade was the D squadron, reinforced for a time by the destroyers attached to the B main fleet, and it was in position as soon as the regulations permitted. The result was that none of the Z destroyers or other torpedo craft stationed at Alderney could get out, and the B main fleet passed the Downs unmolested early in the morning of July 30. It reached Portland on the evening of the same day and there proceeded to coal throughout the night. It left Portland for the westward betimes on the following morning, the blockade of Alderney still being maintained.

X employs his destroyers to "stop the trade."

No sooner had he received intelligence of the outbreak of hostilities than Admiral Wilson began to make his dispositions for "stopping the trade." This, indeed, was only to be his "ultimate aim," according to the "General Idea," but he lost no time in pursuing it. He had 28 destroyers in all, 12 of which were at this time blockaded in Alderney. The four which met him in the Irish Channel were told off to patrol between Carnsore Point and St. David's Head, stopping the trade in that region, and being periodically relieved from a reserve stationed at Queenstown. Seven in all were thus employed. Three others with as many reliefs were engaged daily in a similar patrol off Ushant, leaving Scilly on alternate nights in time to be in station by daylight and returning at nightfall on the same day. Three others were placed in a more advanced position towards the Channel Islands. Other patrols were established in different directions by some of the smaller cruisers and torpedo gunboats, and by this means a large number of more or less fictitious captures was effected. The capture was supposed to be effected under the following regulation issued by Admiral Wilson for the purpose :—"In order that a vessel of the X fleet may claim to have captured a merchant vessel, she must take up a position at least one mile astern of her, and then steam completely round her, passing at least two cables ahead, taking care not to pass so close as to cause any anxiety or inconvenience to the merchant vessel." This is no very difficult performance for a destroyer in the case of an ordinary merchant vessel, but regarded as a method of capture it scarcely corresponds to what would be probable in war. The destroyer's real difficulty would come when she had overtaken her intended prize. She could send her to the bottom, of course, and if she resisted would be justified in doing so. But a capture is not a prize, and therefore in default of overt resistance the destroyer must take its capture into port. For such an operation, however, the destroyer would seem to be very inadequately equipped. As was remarked by a correspondent of *The Times*, "the only way in which a destroyer can really stop the trade of an enemy in real war is by sending to the bottom every hostile merchant ship she comes across. This is a barbarous proceeding, certain to provoke severe reprisals, and a very impolitic one, because a prize in port may be worth hundreds of thousands to her captors, whereas at the bottom of the sea she is worth just nothing at all. The destroyer has no available force to take her prize in charge, she has no accommodation for her crew and passengers if she resolves to sink her, and all she can do if she does not sink her is personally to conduct her into port. This puts the destroyer out of action until the operation is completed, and involves many risks of

recapture. On the whole, then, the game of employing destroyers in stopping the trade does not seem to be worth the candle." It may be thought, perhaps, that a destroyer having a very large engine room complement for her size could spare some portion of it for the purpose of working a capture into port. But the complement is not larger than is necessary to the efficiency of the destroyer, so that on these terms for every merchant vessel captured a destroyer would be crippled; and the situation of a handful of engine-room artificers told off to work an enemy's merchant vessel into port might easily be one which would daunt Captain Kettle himself.

Proceedings of B fleet.

Having coaled at Portland, the B main fleet left that station for the westward on the morning of July 31. Its main purpose was of course to find the X fleet and fight it, for only so could the command of the seas in dispute be obtained. But this purpose was in some measure masked and temporarily suspended at night by the assumed necessity of avoiding the enemy's torpedo craft. In other words, Admiral Noel seems to have attempted to pursue two contradictory and mutually exclusive aims at once. In the daytime he was looking for the enemy's fleet with intent to fight it. In the night he was doing something quite different—avoiding the immediate vicinity of the enemy's port, and steaming about in the open with lights extinguished, and with periodical alterations of course, with the sole object of eluding the enemy's observation and escaping the attentions of his torpedo craft. This diurnal alternation of purpose and disposition appears to be quite fatal to any coherent plan of operations. If the whole purpose of a battle squadron is to be frustrated every night by the putative presence of torpedo craft in its neighbourhood, it would seem that the battle squadron has no business to be at sea in such circumstances. It is presumably at sea for the purpose of fighting the enemy, but it cannot fight and run away at the same time. "There is," as *The Times* has pointed out, "no virtue in keeping the sea if keeping the sea means skulking and scuttling away from possible torpedo craft as soon as the night comes on. If that is really necessary, it is much more logical, and not a whit more pusillanimous, to seek the protection of a port where a port is handy for the purpose"—as Plymouth was on the present occasion.

Comments thereon.

The truth seems to be that the tactics pursued by Admiral Noel were really based on the assumption that battleships and torpedo craft cannot coexist in the same waters. If that assumption is a sound one we seem to be face to face with one of two alternatives—either the battleship is superseded, or its function at sea can only begin when that of the torpedo craft has been brought to an end by agencies adapted to the purpose. Both alternatives seem to be

absurd, but one or other must apparently be accepted unless the assumption which gives rise to both be rejected. Thus nakedly stated, the assumption will probably be rejected by a large consensus of naval opinion. But in a disguised and implicit form it is involved in the tactics adopted by distinguished naval officers on more than one occasion; and unless it can be shown to be untenable, and thereby eliminated from the practice as well as the thought of officers in command of fleets, it seems likely, as recent experience has shown, to paralyse the evolution of a rational and coherent system of naval tactics adapted to modern conditions. No coherent theory and no rational practice can be founded on the coexistence of two elements of naval force which are radically incompatible with one another. There is no practical experience to show, however, that the battleship and the destroyer stand to each other in this mutually exclusive relation. In narrow waters it may be necessary to keep the great ships in hand—that is, in port—for a time until the mutual conflict of torpedo and other fast craft has largely abated the menace of the former, if not extinguished it altogether. The late Admiral Long, as has already been observed, showed how this could be done so far back as 1891, and that no very long time was required to do it. It is true that in those days only torpedo boats were in question. But the difference in speed between the destroyer and the larger vessels now opposed to it is little, if any, greater than that between the torpedo boat and the larger vessels opposed to it in 1891, and as against any larger vessel the only advantage the destroyer has over the torpedo boat is that of speed. Moreover, the battleship itself is, at the worst, no contemptible antagonist for the destroyer. It has never yet been proved that, when all chances are taken into account, the destroyer is much more likely to hit the battleship than the battleship to hit the destroyer.

It is not intended by the foregoing remarks to imply that in the writer's opinion the problem of the tactical relation between battle fleets and torpedo craft in narrow waters is to be solved by ignoring the torpedo craft and letting them do their worst. Nor is it pretended that any final solution of the problem is as yet in view. But it hardly seems probable that the solution will be found in the direction indicated by Admiral Noel's proceedings. The movements of a fleet, like the movements of an army, must always be subject in some measure to the modifications of changing circumstance. But they must, nevertheless, be governed by a definite and continuous purpose. "I will go to the westward," an admiral may say, "because the enemy whom I desire to meet and fight is most likely to be found in that direction; and I will take up a position there in

Comments continued.

which I am most likely to find him, or to obtain definite information of his whereabouts and movements." Such a proceeding is unimpeachable. But it at once becomes inconsequent and futile if its strategic and tactical purpose is liable to be suspended and superseded by quite a different one for a period varying, according to the season, from eight to 12 hours out of every 24. Alternate phases of aggression by daylight and evasion in darkness would thus seem to be incompatible conditions, on which no rational plan of campaign can be founded. If evasion is prescribed by the inexorable requirements of the situation, it disallows aggression altogether; or rather it shows that aggression should for the time be directed by suitable means and agencies against the force which would otherwise compel evasion. In other words, either the battleship can face the torpedo craft at night—all possible efforts being made to keep the latter in effective check—or it cannot. If it cannot, then the battleship must renounce all continuous aggressive purpose until by suitable agencies and methods the menace of the torpedo craft has been reduced to a negligible quantity. If it can, then the aggressive function of the battleship is restored to it and must be pursued, if at all, without hesitation or intermission. After all, the policy of nocturnal evasion is nothing more or less than a leap, or rather a crawl in the dark. Every night that the B fleet was to the southward of the Scillies three of the Z torpedo boats were crossing from the Scillies to Ushant, and three others were crossing in the opposite direction from Ushant to the Scillies. The B fleet was just as likely to encounter them doing what it did—that is, doing its best to avoid them—as it would have been had it been doing what its presence in those waters required it to do—that is, pursuing its aggressive purpose night and day and taking its chance of meeting and beating them. No admiral should say to himself, "I want to catch the enemy's battleships, but I want to avoid his destroyers." The two wants are mutually destructive. To satisfy them both at once is impossible and the attempt to do so is absurd.

The blockade of Alderney and its influence on the operations.

The blockade of Alderney was maintained when the B fleet left Portland for the westward, and was intended by Admiral Noel to be maintained until the close of the operations. This was sound policy from the point of view of his general plan of campaign. He feared nothing but destroyers, and these he feared very much indeed. He had neutralised those stationed at Alderney, and he naturally desired to retain that advantage. At the same time the sealing up of an enemy's force in one of his own ports is a device little compatible with a strategy of relentless aggression, which is the true strategy for a fleet seeking to obtain the command of the sea to pursue. Due allowance being

made for the changed conditions of naval warfare, there is no reason to think that the doctrine and practice of Nelson on this point has even yet been superseded. "I beg to inform your Lordship," he wrote to the Lord Mayor in 1804, "that the port of Toulon has never been blockaded by me; quite the reverse—every opportunity has been offered to the enemy to put to sea, for it is there that we hope to realise the hopes and expectations of our country." A force sealed up in an enemy's port can be neutralised, but it cannot be destroyed. It is only if it is allowed to get out and do its worst that the worst can be done to it. This consideration would seem to apply with peculiar force to torpedo craft. Their sea endurance is limited, and they must return after a short interval to some one or another of a known range of ports, where suitable provision can be made by a vigilant and energetic enemy for their interception—to say nothing of the chance of their being encountered and defeated in the open by an enemy of like calibre. Hence there is, perhaps, something to be said for the policy of allowing the light and fast craft to fight their battle out to within measurable distance of its conclusion before the final issue is joined by the larger and slower craft of both sides. But neither side seems to have acted upon this policy. In any case the following summary, taken from *The Times*, of the casualties resulting from the operations may perhaps be taken to show that the actual performance of torpedo craft is very far from commensurate with the offensive capacity so frequently attributed to them: "There were 32 destroyers and ten torpedo boats attached to the B fleet. Their total 'bag' of larger ships belonging to the X fleet was one cruiser, the INTREPID, obtained at the loss of two destroyers, and they advanced only three claims in all, none of which were allowed. Their total losses were 15 destroyers permanently out of action, six out of action for 48 hours, and the *Viper* a total wreck. Their chief performance was the blockade of Alderney, which, in conjunction with a squadron of supporting cruisers, they accomplished successfully so far as its main purpose was concerned; but, having accomplished it, such of them as were engaged in the operation fell an easy prey to the X fleet when it raised the blockade. To the X fleet 28 destroyers and ten torpedo boats were attached. Their total 'bag' of larger craft belonging to B was only one cruiser, the *Minerva*, obtained at the cost of three torpedo boats; their total losses were six destroyers and five torpedo boats permanently out of action, ten destroyers and two torpedo boats out of action for 48 hours, and one torpedo boat sunk. In other words, the actual achievements of the torpedo craft were demonstrably not commensurate with the losses they incurred. There were 12 battleships and

25 cruisers on one side exposed to the attack of 28 destroyers and ten torpedo boats; and on the other side there were eight battleships and 24 cruisers exposed to the attack of 32 destroyers and ten torpedo boats. Each side lost one cruiser only as the result of direct torpedo attack. The field of operations practically extended only from the longitude of Spithead to the Soundings. In other words, the whole of it was within the radius of action of a destroyer, and large sections of it were well within the radius of action of torpedo boats."

Admiral Wilson raises the blockade.

On the other hand, since Admiral Noel thought it important to maintain the blockade at Alderney, he must have held it to be probable that Admiral Wilson would think it equally important to raise the blockade. As a matter of fact this was the primary object which Admiral Wilson proposed to himself when he left Scilly after coaling there on the evening of July 31. He achieved it completely on the following morning, and the course of events at this juncture may here be given in the following extract from the "Narrative" of the umpires:—"At 6 P.M. X main fleet put to sea, having been detained by fog for some hours; they were observed by *Minerva* at 7.25 P.M., but fog coming on she lost them at 7.45 P.M. X main fleet stood to the southward, and at 9.30 P.M. shaped course up channel at 13 knots; thick fog prevailed, which lifted at intervals. At about 9.15 A.M. on August 1 course was altered to the south, and X stood in for Alderney in two divisions in line ahead, three miles apart, with the two cruiser divisions also in line ahead, three miles on the outer bow of its corresponding battleship division, thus forming a complete enveloping movement. At 10.20 A.M. B cruisers and destroyers were sighted, and X then increased speed to 14 knots and fire was opened on them at 4800 yards range. B vessels turned and ran through the Swinge, the torpedo gunboats and destroyers of Z squadron following them. The first division of cruisers passed round the east end of Alderney, in case they should turn to the east, and the second division, going round to the west of the Casquets, engaged the flying vessels as they came up with them. The battleship division guarded the other passages between Alderney and the Casquets. The result of these operations was the capture of the *Severn*, *Mercury*, *Leda*, and five destroyers of B, with a loss of only two destroyers of X fleet, who then returned to Scilly Islands, where they arrived on the forenoon of the 2nd." This narrative is reproduced with some additional details in the Parliamentary Report.

Comments on the situation.

Thus in spite of—perhaps, indeed, in consequence of—Admiral Noel's advance to the westward with intent to find and fight the X

fleet, Admiral Wilson was able to score a second and signal advantage. He had released a dozen of his own destroyers and captured five destroyers belonging to the enemy, together with three of his cruisers. He had shown that, although a hostile fleet numerically superior to his own was at large and on the look-out for him, he could steam some 170 miles across the disputed waters and back again, conducting an important operation with decisive success, without being intercepted or even observed by his adversary. The B fleet after leaving Portland steered a course to the westward until towards evening, when a point was reached some 25 miles south-east of the Lizard. Course was then altered to the south-west for the night, so as to take the fleet outside the probable range of the enemy's torpedo craft, and at midnight it was reversed, so as to reach the neighbourhood of the Lizard in the morning. It was during this fugitive excursion to the south-westward that the X fleet passed in mid-Channel unobserved and unmolested. Its departure from Scilly had been delayed for some hours by fog. Had it left at 2 P.M. as intended, and followed the same course and speed, it is stated in the Parliamentary Report that it "would almost to a certainty have been met by the B fleet between 8 and 9 P.M. that evening." But in view of what happened on the night of August 3–4, when we learn from the Parliamentary Report that the two fleets were very close to each other, and were known by both admirals to be so, but that "neither wished to engage during dark," it seems doubtful whether an action would have ensued. It is not, however, clear why a fleet which desires to avoid a night action—and yet, like the B fleet, is only at sea for the purpose of fighting an action—should keep the sea for the night when a convenient port is at hand. The B fleet would have been much safer at Plymouth on the night of July 31, and no more out of the way. It would, moreover, have been much more advantageously placed for the rapid receipt of intelligence.

Was B well placed so far to the westward?

It may further be suggested that if the X fleet was likely to raise the blockade of Alderney, the best place, or at least as good a place as any for the B fleet to look for it, and if necessary to wait for it, was in the neighbourhood of the Channel Islands. So long as the blockade was maintained there were likely to be very few hostile torpedo craft at large in this region, and therefore the B fleet, having taking up a position suited to its purposes, could have maintained it by night as well as by day without much fear of molestation. Sooner or later the X fleet must come to seek it there, and as the distance between the Scillies and Alderney could be traversed in a single night—a period during which the B fleet could find nothing better

to do than to run away from the position it had taken up further to the westward—it seems certain that the desired conflict was much more likely to be brought about in the neighbourhood of the Channel Islands than in the neighbourhood of the Scillies. It is true that in the Channel Islands, as in the Scillies, Admiral Wilson had an impregnable port into which, if hard pressed, he might have retired without fear of being followed or molested. But this would practically have been to own himself worsted in the contest for the command of the sea. He would thenceforth have been shadowed night and day by the B fleet in the offing, and could never hope to escape without fighting the adversary before whom he had already retreated. In the alternative, unless Admiral Noel could make sure of intercepting and defeating the X fleet to the westward, the blockade of Alderney was certain to be raised, and the blockading force was certain to be overpowered and destroyed. The X fleet had an advantage of at least two knots' speed over the B fleet. If, on issuing from Scilly, it could manage to slip past the B fleet to the eastward—as it did, not once, but twice, in the course of a single week—the latter could hardly expect to overtake it before it had accomplished its purpose. On the other hand, by covering the Channel Islands, Admiral Noel could have made certain that the X fleet could not reach them without either fighting a decisive action or withdrawing from the contest altogether.

B returns to Portland, and subsequently proceeds again to the westward.

The raising of the blockade of Alderney brought to a close the second stage of the operations. Admiral Noel only received information of the advance of the X fleet to the eastward when it was far too late to attempt to frustrate its purpose, and having looked in at the Channel Islands, only to find that the bird had flown, as he must have anticipated, he returned again to Portland to coal. Thence he set out again on the morning of August 3 and made again for the westward. The same tactics were pursued with precisely the same result. The "Narrative" of the umpires may here again be followed. It gives in a concise form the course of events which preceded the final encounter:—"Both fleets having taken in the coal they required, B fleet again left Portland at 5.30 A.M. on August 3 with his battle fleet and all available destroyers and proceeded towards the Scilly Islands. The destroyer flotilla proceeded down Channel ahead of B, with orders to take up a position for the night between B's battle squadron and the Scilly Islands, all B's detached vessels being warned of the route B would follow. In the evening some destroyers and a cruiser were sighted and chased away. About 3 P.M. X sent out three destroyers to endeavour to find B's main fleet, and at 5 P.M. X sailed with his

whole squadron, with the intention of bringing on an engagement the next day. X finding himself watched by some destroyers and a torpedo gunboat, the first division of cruisers was ordered to clear them away. Whilst chasing the B destroyers the ARROGANT fell in with the X destroyers that had been sent out to locate B main fleet, which they reported bearing S.E., and this information was transmitted to X, main fleet by ARROGANT'S wireless telegraph. X, being unwilling to bring on a night action, recalled his cruisers and stood to the southward, with the object of getting to the east of B. At 6.40 P.M. that evening the B cruisers *Amphitrite, Edgar* and *Melampus* chased a third-class cruiser and some destroyers. The former they claimed to have put out of action; she proved to be the *Prometheus*, who, with the C destroyers, was proceeding from Plymouth to meet B main fleet. At 8.35 P.M. the three cruisers sighted X main fleet and kept ahead of them for some time. At about 11 P.M. the *Amphitrite* passed down the whole X line, and was fired upon by all X's ships, at a distance varying from 2,000 to 6,000 yards, for which she was subsequently placed out of action. At 2 A.M. of August 4, the *Speedwell*—of B fleet—reported a fleet of 20 vessels S.S.W., the two fleets at this time being very close to each other; but each desired to avoid a night action. At 4 A.M. on the 4th, B main fleet was in lat. 49° 26′ N., long. 6° W., and was joined there by *Amphitrite* (not then adjudicated on by the umpires, as the claim was not received until 7.45 P.M. of the 4th), *Edgar, Prometheus, Skipjack, Antelope,* and 12 or 13 destroyers, who had no definite news of X main fleet's movements. . . . At 9.30 A.M. on the 4th, X main fleet was at a rendezvous 40 miles south of the Start. . . . X turned to the westward to search for B, but MARS'S steering gear breaking down X decided to postpone the engagement till next day, and proceeded to Guernsey and anchored there at 5.30 P.M. X telegraphed to Alderney for four destroyers, to ensure finding B next day, and on their arrival at 11 P.M. they sailed in search of B main fleet. X main fleet left Guernsey at midnight. The B main fleet stood out towards lat. 50° N., long. 9° W., arriving about 11 P.M., when B turned and stood to the southward of the Scilly Islands."

Comments on the foregoing.

So far the "Narrative," which is expanded in the Parliamentary report, but the additional details given in the latter are of minor importance. It seems to invite comment at several points. In this penultimate stage of the proceedings the destroyers were in full activity on both sides, but they effected little or nothing. The B destroyers succeeded in finding the X main fleet, but they were incontinently cleared away and their discovery availed them little. When they and others rejoined their admiral on the following

morning "they had no definite news of X main fleet's movements." In like manner the B main fleet sighted some destroyers and chased them away. There is nothing in these experiences to show that battleships and destroyers cannot coexist in the same waters. On the contrary, the incident seems to suggest that it is all a question of hit or miss, with heavy odds on the miss. If a force of destroyers which sights an enemy towards nightfall can only report the next morning that it has no definite news of his movements and no knowledge of his whereabouts, its scouting efficiency must be placed rather low and its offensive capacity still lower. It is true that the X destroyers did locate the B main fleet and communicated the information to X main fleet; but they were just as easily chased away, they made no attack during the night, and the information they conveyed proved of little importance, as X was "unwilling to bring on a night action," the same unwillingness being attributed to both sides at a later hour of the same night. We are thus presented with the following extraordinary situation. Two fleets, each desiring to fight the other, are within a few miles of each other for several hours during a given night. Each is aware of the near presence of the other, and each has been sighted shortly before nightfall by the destroyers of the other, which are apparently swarming in the neighbourhood. Yet neither attempts to attack the other, and neither is attacked by the destroyers of the other. When daylight returns neither knows where the other is, and the cruisers and destroyers of both sides are just as much in the dark. If this is good strategy, good tactics, and good scouting, we must in future take our lessons in those arts from blind man's buff. Nelson would have given worlds for such an opportunity when he was searching for Villeneuve; but he would never have let it slip because he was "unwilling to bring on a night action."

Comments continued.

Another remarkable incident in this really ludicrous imbroglio is the strange performance of the *Amphitrite*. This vessel first distinguished herself, with two of her consorts, by claiming to have put out of action, in daylight, a cruiser of her own side which was accompanied by some friendly destroyers. During the ensuing night she steamed within range of the whole of the X main fleet, receiving the fire of each ship in succession. In other words she deliberately committed suicide, for all that appears to the contrary. The firing was heard, as the present writer can testify, from the deck of the *Revenge*, the flagship of Admiral Noel, and even the flashes of the guns were seen. But the desire to avoid a night action was the paramount motive of the moment, and no notice was taken of them. Not so did Hawke teach the British Navy how to win the command of the

sea. On a pitch dark night, in a tearing gale, in a perilous and uncharted sea—which even his own sailing-master was loth to navigate—he pursued Conflans into Quiberon Bay, and there and then destroyed him. Had he waited until the day dawned or the weather abated, Conflans might have lived to be master of the Channel.

Further proceedings of B.

The following day, August 4, was spent by Admiral Noel in vain searchings during the daytime, and in fugitive counter-marching at night. It was on this day that he made a signal to his fleet expressing his disappointment at getting so little definite information from his cruisers. But was this altogether the fault of his cruisers? The *Amphitrite* could have told him exactly where the enemy was about the previous midnight, and, had he desired it, he could have obtained that information for himself. Still, the *Amphitrite's* proceedings are more than a little puzzling. Keeping touch with a fleet does not mean remaining for a considerable time within the range of its guns and, indeed, receiving the fire of its ships one after the other. But after she had done the worst she could for herself in this way, it is not clear why she should have subsequently relinquished the touch which it was so important for her to maintain. Perhaps a fleet which hesitates to fight a night action is not likely to find its cruisers actuated by a much more adventurous spirit. But the *Amphitrite* seems to have combined the maximum of fighting temerity with no very high standard of scouting efficiency. If cruisers cannot scout at night, and battleships must not fight at night, the sooner we revise all our principles of strategy and tactics the better. It would seem that henceforth they must be based on the precedent of Tweedledum and Tweedledee—"'Let's fight till six, and then have dinner.' 'Very well,' the other said rather sadly; 'and *she* can watch us—only you'd better not come *very* close,' he added: 'I generally hit everything I can see'"—as indeed the *Amphitrite* seems to have discovered.

Opportunity lost by B.

It appears from the sequel that Admiral Noel lost a great advantage when he relinquished touch with the X main fleet on the night of August 3–4. Admiral Wilson, "unwilling to bring on a night action," had manœuvred successfully to get to the eastward of B. From such a position his superior speed would enable him to advance up the Channel unmolested. But he did not originally intend to take advantage of the strategic freedom of action thus secured. There was nothing to be gained by it. His object was to find and fight the B main fleet, not indeed to fight it at night, but to fight it as soon as he could find it by day. As he now knew it was to the westward of him, it was useless to look for it to the eastward. Accordingly,

having reached a rendezvous 40 miles south of the Start, he turned again to the westward to search for B. But at this juncture the steering gear of the MARS broke down and he accordingly "decided to postpone the engagement till next day," proceeding to Guernsey in the meanwhile. Had the B fleet been at hand at this moment, Admiral Wilson must either have retreated before it or have fought the action with one of his battleships partially disabled. But the B fleet had wandered away to the westward and was some 40 miles south of the Scillies at the time when the MARS broke down at about the same distance off the Start. There is nothing to be surprised at in this, however. Fleets which desire to avoid a night action, and make their dispositions accordingly, must often find themselves a long way apart when daylight reappears.

The fleets meet at last and engage.

At last, however, about noon on August 5, the two fleets managed to sight each other in daylight off the Lizard. As the Parliamentary report * contains the only authentic account of the engagement which ensued, it may here be quoted at length:—

The Fleets were in sight of each other at noon, steering on converging courses; both being in divisions in line ahead disposed abeam to starboard. The B Cruisers, consisting of six ships, were in line ahead, disposed on the starboard beam of the 2nd Division of Battleships. The X Cruisers were also in line ahead in two divisions; a weak division of two 2nd and two 3rd Class Cruisers on the starboard beam of the 2nd Battleship Division, and a division of six Cruisers on the port beam of the 1st Battleship Division. Two other Cruisers, the IMMORTALITÉ and NARCISSUS, were placed in the 1st and 2nd Battleship Divisions respectively. At about 12.20, X Fleet formed in single line ahead, with the MAGNIFICENT leading and the MAJESTIC in the centre, and in this formation stood to the northward; the large Cruiser Division following in line ahead, and the small Cruiser Division on the starboard beam (the disengaged side) of the Battleships. About the same time B Fleet formed into sub-divisions in line ahead with the 2nd sub-division on the port side of the 1st, and the 4th and 3rd on the starboard side (2, 1, 4, 3), and altered course to the northward. The Cruiser Division made a long sweep round and formed on the starboard quarter, and some distance in rear of the Battleships. At 1.15 p.m. both Fleets opened fire, the range being 7,000 yards; X in single line ahead standing N.W., and B in sub-divisions in line ahead disposed on a bearing steering north. The X Fleet maintained the single line formation throughout, and having a considerable superiority in speed manœuvred to concentrate the fire of the Fleet on the van of B, working round gradually and closing. B Fleet was thus forced to keep altering course on the inner circle, the formation generally being sub-divisions in line ahead, the bearing of the leading Ships from each other being altered from time to time as required. Between 1.28 and 1.38 the Fleet was in line ahead, and a large alteration of course to the westward was made, after which the sub-division formation was resumed until 2.10, when single line was again formed. B claims to have concentrated his fire on the rear of X. At 2.15 reference to the Umpires was agreed to, and the action ceased. At this time both Fleets were in single line and steering the same course at a distance of 2,000 yards, the leading Ship of B being abreast of the centre of X. A few minutes after the action commenced the large Cruiser Division of X altered course so as to pass across the rear of the B Battleships and ahead of the B Cruisers, the latter being some distance astern, but by the time the X Cruisers were passing between them and the Battleships were well within range. The X Cruisers engaged the rear of the Battleships on the starboard side, and the B Cruisers on the port side, but subsequently the engagement was continued between the Cruisers. When the action ceased both these Squadrons were in line ahead and steering towards their own Battleships. The remaining Cruisers of X remained on the off side of the Battleships during the action. At the conclusion of the battle a wireless message was received ordering the immediate cessation of hostilities.

* About to be published.—ED.

It would seem that the message above mentioned must have been despatched from the Admiralty long before the fleets met and fought, or at any rate before the Admiralty could have learnt that an engagement was proceeding or even imminent. It must apparently be assumed, therefore, that the Admiralty thought either that the manœuvres had lasted long enough, and that the practical lessons to be learnt from them had been exhausted, or else that the cruiser actions of July 29 and the raising of the blockade at Alderney on the morning of August 1, together with other losses sustained by B in the course of the operations, had given the X side an advantage so great as to establish its definite superiority over B. It is, however, for some reasons to be regretted that the Admiralty should have reached this conclusion before the two fleets had met and fought, so as to leave the undisputed command of the sea in the hands of the victor. Such a decision might lend some countenance to the view that the command of the sea can be held and obtained by the fleet of one side while a fleet of the other side is still at large, still unimpaired in battleship strength, and still ready to fight—in the daytime. Such a view could hardly be entertained by the Admiralty, because it seems to run directly counter to the "General Idea" of the manœuvres. The B fleet had lost none of its battleships, and all its bases were still intact and unassailed. It had still several destroyers at large, and quite as many cruisers as are generally attached by the Admiralty to our fighting fleets in commission. Its losses in cruisers and torpedo craft were undoubtedly heavy and embarrassing. But if on that account it was authoritatively held to have lost the command of the sea, and to be incapable of recovering it, many doctrines of naval strategy hitherto accepted will have to be revised, and some of the most cogent teachings of naval history will have to be set aside. The superiority in cruisers established by Admiral Wilson in the course of the operations gave him no doubt a considerable, but still limited, power of "stopping the trade." But that was only his "ultimate aim." He was first required to "obtain the command" of the seas in dispute. That, according to the teaching of history, on which the accepted doctrines of naval strategy are based, could only be obtained by encountering the fleet opposed to him and defeating it. "It is not," says Captain Mahan, "the taking of individual ships or convoys, be they few or many, that strikes down the money power of the nation; it is the possession of that overbearing power on the sea which drives the enemy's flag from it, and allows it to appear only as a fugitive, and which, by controlling the great common, closes the highways by which commerce moves to

Was the issue decided before the action was fought?

or from the enemy's shores. This overbearing power can only be exercised by great navies." Great navies were represented in the manœuvres by two great fleets, and until one of these had got the better of the other, either by "defeating him" or by "shutting him up in his ports," there could, according to the authoritative definition of the Admiralty, be no command of the sea. Be this as it may, the fact remains that the Admiralty had resolved to bring the operations to an end before the main issue had been decided. Perhaps they thought that the haphazard, intermittent, hit-or-miss tactics adopted by two fleets, both of which desired to avoid a night action, were likely to be prolonged indefinitely before leading to a decisive issue. On the other hand, it is just possible that the reluctance of both fleets to engage at night was due to private instructions received from the Admiralty. But this is hardly credible. The Admiralty had ordained that the operations should take place in the very midst of the most crowded seaway in the world. They would have stultified themselves had they required the fleets to take the not inconsiderable risks thus involved, and forbidden them to take the slight additional risk of engaging at night. They would also have based the whole scheme of operations on the negation of what would be probable in war, if the principles and practice of men like Hawke and Nelson are not forgotten in the British Navy, while ostensibly directing the umpires to decide each case on its merits on the basis of what would be probable in war. The responsibility of conducting the operations on the principles of Tweedledum and Tweedledee must therefore rest with the admirals engaged, in default of specific evidence to the contrary.

The result of the final action is very curiously indicated in the tabular statement issued by the umpires of "Claims by X Fleet," and of their own decisions thereupon. It is there stated, and the statement is reproduced in the Parliamentary Report, that on August 5 at 1 P.M. by Greenwich mean time the X fleet claimed the B fleet, and that this claim was "decided in favour of X fleet." Hardly since Jericho fell has any such victory been recorded, for, since we have it on the same authority that "the action commenced at 1.15," it would seem that its result was decided a quarter of an hour before it began. Unless this is a clerical error, which seems unlikely, it must be taken to imply that the judgment of the umpires was at variance with that of the Admiralty, and that they held, in opposition to the Admiralty, that the B battle squadron was at no time strong enough to hold its own against the X battle squadron in a general action. This is quite an arguable proposition, but it is one which must be left to be argued out between the umpires and the Admiralty.

Between two such high authorities it would be unbecoming and almost impertinent for a mere outsider to interfere.

No tactical issues involved.

In these circumstances it would obviously be superfluous to discuss the tactics adopted by either side in the general engagement of August 5. It appears to be officially acknowledged that they did not affect the result; and though they are described in outline in the Parliamentary Report, no opinion on their merits is expressed either there or in the "Narrative" of the umpires, which is altogether silent on the subject. It might, therefore, be impolitic for an outsider to discuss them at all. Nevertheless, it is very much to be wished that the Admiralty should adopt some definite and intelligible policy in regard to the very important and yet very delicate question whether the discussion of tactical issues by the public Press and other unofficial publications is or is not to be encouraged or even sanctioned. Before the action began both admirals requested the Press representatives attached to their respective fleets to refrain from describing its details. This prohibition, for such it was in effect, was loyally respected at the time, though the Parliamentary Report would seem in some measure to have placed it in abeyance. The opinion is very general, though not perhaps universal in the service, that battle tactics should at all times be regarded as matters of the strictest official secrecy. For this reason, when the Mediterranean and Channel squadrons were combined for tactical exercises a few weeks after the manœuvres, no representatives of the Press were allowed to witness the operations, and even the presence of private guests was forbidden. It is not perhaps for the present writer, who has more than once enjoyed the special indulgence of the Admiralty, to dispute the wisdom of such a policy, the sole object of which must be to prevent foreign governments from obtaining information which might in certain contingencies be used to the prejudice of this country. If such an object is likely to be attained there is no more to be said. But the Stephen Commission declared in 1887 that "foreign countries already know all that they care to know about our army and navy," and there seems little reason to doubt that they are just as well informed now as they were fifteen years ago. If this be so the danger is great that the pursuit of official secrecy may prove to be a delusion—that foreign countries will always find out all that they want or care to know, and that the only people to be kept in the dark will be the people of this country. The question can easily be brought to a very simple and practical test. Is there anything in the practice of foreign navies which the Admiralty want to know and cannot find out, or could not find out if they went the right way to work? The right way may be a very dirty way, but the betrayal

of secrets can never be a respectable trade, though it is often a very lucrative one. Things which are done in the presence of great fleets must always be done under the eyes of a good many people whose discretion and reticence are not so conspicuous as their good faith, and of some few who are not proof against such bribes as foreign governments can offer for the information they desire. We have no guarantee that the whole history of the combined operations of the Mediterranean and Channel squadrons is not already in the hands of such foreign governments as have cared to pay the price for them. All that is certain is that the people of this country know nothing whatever about them.

General conclusions.

Of the manœuvres as a whole it may be said without hesitation that they were full of pregnant instruction and fuller still of not less significant warning. It is not pretended that the criticisms offered above are final and unanswerable, but they are such as have suggested themselves to a not inexperienced observer; they are offered in no dogmatic spirit, and are intended rather to promote fruitful discussion than to sustain the personal opinions of the writer. The question was asked in *The Times* at the close of the manœuvres, "Have we nothing to learn about the art of scouting, about the strategic planning of a campaign and its tactical evolution, about the handling of destroyers and other torpedo craft, about the true relation of the destroyer to the battleship, alike in attack and defence—in a word, about the training of the naval officer for naval battle?" The foregoing narrative must furnish reasons in abundance for thinking that we have a great deal to learn about these and many other matters of no small moment in the training of the Navy for war. It can hardly be said that we have nothing to learn about the art of scouting when, after a week's operations, an admiral is found expressing his disappointment that he has got so little definite information from his cruisers. If this is all that we ought to expect, if the art of scouting is, at its best, no better than looking for a needle in a bundle of hay, and seldom discovering it, the sooner we know it the better. But assuredly this discouraging and disquieting conclusion cannot be accepted so long as the Admiralty are unable, for lack of ships and crews, to make adequate provision for the sustained and systematic study of scouting, for the determination of its best methods, and for the regular training of naval officers in their use. As to the strategic planning of a campaign and its tactical evolution, we stand, perhaps, on more difficult and more delicate ground. Naval warfare must needs be full of uncertainties at all times. The best-laid schemes may often be frustrated by circumstances which could not be foreseen. Nelson went all

the way to the West Indies in pursuit of Villeneuve, and there missed him, misled by false information. It is not always safe, therefore, to condemn a plan because it failed. It might have been the best although it failed. But if to a plan which failed there seems to have been an alternative which was less likely to fail, which, if it succeeded, would secure all the results aimed at by the plan which did not succeed, it is at least permissible to suggest that there might have been some lack of judgment and of logical grasp in the adoption of the unsuccessful plan. Again, the tactical evolution of a given plan of campaign is another very delicate matter for criticism. It is easy to find fault, and he who does so is very apt to overlook some of the considerations which determined the operations criticised. But we live in an age when the revered traditions of the past are brought into sharp collision with the conditions and requirements of the changed and changing present. There is, for example, no stronger tradition of the past than that which prescribes that a fleet which seeks to hold the sea must keep the sea and be ready for all emergencies. But if there is an emergency—namely, the attack of torpedo craft, or the contingency of having to fight a night action—for which the fleet which keeps the sea is not ready, and if that emergency is a possible incident of darkness at all times, it seems obvious that the old tradition must either be abandoned, or else duly co-ordinated and reconciled with the new conditions of the case. How it is to be reconciled is just one of those questions which the manœuvres have left unanswered, whilst emphasizing the urgent need for finding an answer to it. In any case it is safe to say that the answer is not to be found in the methods of Tweedledum and Tweedledee. At least that negative conclusion may be regarded as established by the manœuvres.

The question of destroyers and other torpedo craft.

In the handling of destroyers and other torpedo craft, again, it cannot be denied that our admirals and senior officers have a great deal to learn. They must make up their minds as to what these vessels can do and what they cannot, how they can be employed to the best advantage, whether they are to be scouts, or commerce destroyers, or torpedo craft proper. Above all they must learn to establish some rational relation between the menace they can properly exert and the injury they are likely to inflict. It is hardly too much to say that the menace of the torpedo craft opposed to him was at the bottom of all Admiral Noel's dispositions, and indirectly the cause of his discomfiture. The actual injury they inflicted on him was the loss of a single second-class cruiser. On the other hand, it is not perhaps hazardous to conjecture that the employment by Admiral Wilson of his destroyers in the rather burlesque performance

of pretending to "stop the trade" was the veil of a crafty tactical purpose. By keeping them behind him he prevented their attacking him by mistake, and could safely open fire on any destroyer he saw with little or no fear of her turning out to be a friend. But this is as much as to say that the destroyer as an element of naval force has not yet been co-ordinated with other elements—a practical proof that the true relation of the destroyer to the sea-going ship has not yet been determined. There is, perhaps, no outstanding problem of naval organisation and tactics which presses more urgently for solution than this, none of which the solution is fraught with larger or more momentous consequences.

JAMES R. THURSFIELD.

CHAPTER VI.

Foreign Manœuvres.

France.

The scheme of operations.

The French manœuvres of 1901 attracted a great deal of attention by reason of the interesting scheme of operations, the large number of vessels engaged, and some of the prominent episodes. For the first time in such manœuvres the French squadrons were employed in a manner approaching rather nearly to the actual conditions of war, and the fleet which took the offensive—though its object was really defensive—represented the naval forces of France. The theme was a struggle for the command of the Mediterranean, and two squadrons were employed on either side. These have been variously designated in accounts which have been published, but it will be convenient here, for the sake of greater clearness, to adopt a colour distinction between the opposing forces, and to speak of the French force conventionally as "Blue," with its two squadrons A and A^1, and its enemy as "Red," comprising squadrons B and C. "Blue A" was in the Mediterranean, between the Balearic Islands and Gibraltar, when operations began, and its purpose was to prevent "Red B," which was approaching from the Channel, from effecting a junction with its C squadron, which was at Corsica. The "Blue A^1" squadron from Brest was also endeavouring to enter the Mediterranean, with the object of joining forces with the A squadron. An obvious analogy was suggested with an attempt of the British Channel Squadron to unite with the Mediterranean Fleet, while the French Mediterranean Squadron endeavoured to interpose, and to unite with a squadron from Brest. That such an idea was in the minds of those who drew up the plan of operations is probable, but an examination of the forces engaged shows that these were disproportionate to the relative strength of the British and French squadrons in such cases; and it seems just as likely that the "Red" enemy was supposed to represent German and Italian squadrons seeking to effect a junction, with the view of defeating or blockading the French Mediterranean Fleet.

Forces engaged

The following was the composition of the squadrons engaged, and the figures within brackets indicate the numerical value assigned under the rules to the various ships. Admiral Gervais was again "admiralissimo," with a special commission, and directed the

operations, having his flag in the Bouvet, with which were the Galilée and Hallebarde.

"BLUE."

"A."—Vice-Admiral de Maigret.

Battleships: Saint Louis, Charlemagne, Gaulois, Brennus (each 250). Armoured cruisers: Pothuau, Chanzy, Latouche-Tréville (each 50). Cruising vessels: Cassard (25), Du Chayla (25), Foudre (20), Linois (20), Condor (10).

"A¹."—Rear-Admiral Mallarmé.

Battleships: Bouvines, Amiral Tréhouart (each 150). Torpedo gunboat La Hire (5). Also the collier Japon.

These squadrons were supported by the boats of the mobile defences of Algeria and Tunis, concentrated at Algiers, and of Toulon. The "Blue" coasts were those of France and Algeria; Toulon and Algiers were impregnable; the other important places were fortified, but might be attacked.

"RED."

"B."—Vice-Admiral Ménard.

Battleships: Masséna (150), Carnot (150), Hoche, Amiral Baudin, Formidable, Courbet (each 125). Armoured cruisers: Bruix, Dupuy de Lôme (each 50). Cruising vessels: D'Assas (25), Surcouf (15), Cassini (10).

"C."—Rear-Admiral Aubry de la Noë.

Battleships: Charles Martel, Jauréguiberry (each 200). Cruising vessels: Lavoisier (20), Dunois (5).

To the "Red" squadrons was attached the mobile defence of Corsica, and the coasts it was to protect were those of Corsica and Tunis, while those of Spain, the Balearic Islands, and Sardinia were neutral. Ajaccio and Bizerta were impregnable.

Rules. In fighting value the "Blue" squadron was worth—A, 1250; A¹, 305; together, 1555. "Red" was worth—B, 950; C, 425; in all, 1375. In speed "Blue A" was superior to "Red B," but "Blue A¹" was inferior to both the "Red" squadrons. The rule was that, before engaging, each ship should signal her fighting value, and the result of an action was to be determined by the stronger ship or squadron keeping the weaker under fire for twenty minutes at less than 5000 yards or for ten minutes at less than 3000 yards, these distances being reduced at night by one-half. After an engagement Admiral Gervais could put ships out of action or reduce their fighting value to indicate their diminished power through injury in action. This plan is not new in the French manœuvres, and has much to commend it. It enables an approach to be made to the conditions of war, but does not bind the hands of the umpire, and, as a matter of fact, Admiral Gervais did not strictly adhere to the rule, having no desire to see the manœuvres brought to a premature end. The other rules need not be cited, because they do not seem to have been brought into operation.

Defeat of B at Alicante.

The manœuvres began on July 3rd, when intelligence reached Admiral de Maigret, commanding the "Blue A" squadron, who had come westward from Algiers, that B had passed the Straits of Gibraltar at 8 o'clock in the morning, steaming at 13 knots in the direction of Cape Palos. The "Blue" Admiral thereupon proceeded at full speed towards his adversary, and at 4 o'clock on the morning of July 4th, to the south of Cape Palos, and half-way between the coasts of Spain and Africa, the enemy's cruisers were discovered steaming north-eastward. An engagement followed, in which the superior strength of the "Blue" battle squadron sufficed to defeat them forthwith. They were the Dupuy de Lôme, Bruix, and D'Assas, and were put out of action for 48 hours at Alicante. The "Red B" squadron was thus bereft of a very valuable force. Shortly afterwards the Espingole arrived, bringing intelligence to Admiral de Maigret that the B battle squadron was to the northward, attempting to escape north-east by keeping near to the Spanish coast. The "Blue" Admiral immediately ordered full speed, and, owing to the direction of the coast, which would have compelled "Red B" to approach the "Blue A" squadron upon a converging course, Vice-Admiral Ménard, commanding the former, altered course to the south, with the hope of gaining time and enabling his C squadron, which had been under observation at Corsica, to join him. He was, however, taken at a disadvantage, and after some manœuvring the "Blue A" squadron approached in line ahead and opened fire. The action took place near Alicante, and the "Red B" squadron, being driven into Spanish territorial waters by a much superior force, was defeated.

Further operations.

Admiral Gervais, who arrived on the scene in the Bouvet, not desiring the operations to come to an end or lose their principal interest and value in this manner, signalled the two fleets to take formation under his orders, and they engaged in steam tactics during the afternoon. He then directed the "Blue" squadron to proceed towards Oran, and the "Red" squadron to go eastward, so that the course of operations might be resumed. The advantage of having an umpire on the spot is obvious, and the great fleet which had been assembled was not allowed to waste its opportunities because a premature battle had given a victory to one side. It was considered that the engagement had resulted in the escape of the "Red B" squadron, but that both forces had had their fighting value reduced by damage sustained. The event, however, enabled the two "Red" squadrons to unite, the C squadron, under Admiral de la Noë, having come westward from Corsica, and the accession of strength thus brought by the addition of the Charles Martel and the

Jauréguiberry made "Red B and C" superior to "Blue A." Admiral de Maigret had therefore no choice but to fly. He proceeded at full speed towards Oran, and, shortly after midnight on July 5th, fell in with his own A^1 squadron, having in company with it the collier Japon. The united A force of the "Blues" thereupon proceeded to Mers-el-Kébir, while the cruisers endeavoured to keep touch with the enemy.

Movements of A.

The ships were coaled rapidly from the Japon, by means of the Temperley apparatus, and at 11 o'clock on the morning of the 6th the combined squadrons left the port in bad weather, steaming at 12 knots against a head sea towards Ajaccio, where Admiral de Maigret expected to find the B and C "Red" fleets. The speed was kept up without difficulty by the battleships, and it was remarked that, though they took heavy seas over, the Bouvet, Saint Louis, Charlemagne and Gaulois would have been able to fight all their guns, while the same would not have been the case with the Bouvines and Tréhouart. The torpedo-gunboats could not keep the speed and fell astern. On the night of the 7th, the A (or "Blue") squadron steamed without lights in anticipation of a possible attack from the torpedo-boats of the Corsican mobile defence, but none was made. The Corsican coast was in view in the morning, and at midday the united squadron, joined by the Foudre and the Toulon torpedo-boats, was before Ajaccio, where the fighting-tops of the "Red" battleships and cruisers were discovered, showing where the ships lay at anchor at the port. Measures were taken to establish a blockade, the defending torpedo craft were driven from their shelter at the Sanguinaires Islands, the Lèvrier and three boats being put out of action, and the "Blue" ships steamed slowly during the night with navigation lights extinguished upon prescribed courses, but the B and C "Red" squadrons did not move.

Action off Ajaccio. Victory of B and C.

Very early on the morning of the 9th, however, they put to sea, the battleships leading, and sighted the "Blue" squadron, then steaming north. Fire was opened upon the sternmost ships at something over 4000 yards with the bow guns, and the "Blue" squadron was considered to have been placed at a disadvantage. While Admiral de Maigret was reforming, his adversary was skilfully manœuvring, and, in line ahead, appears to have steamed past the "Blue" squadron, then in line abreast. This action, which lasted about half an hour, marked the conclusion of the first series of operations. Although "Red" was inferior in numbers it was thought that by skilful manœuvring "Blue" had been defeated.

Coaling and victualling evolutions at Toulon.

After the engagement off Ajaccio, Admiral Gervais ordered the squadrons to separate, and they proceeded independently to the Iles d'Hyères, and on July 11th reached Toulon to coal and complete with stores. Considerable importance was attached to

the operation. Forty-one warships were to be supplied with everything they required. They took on board 13,000 tons of coal, 70 tons of petroleum, and a vast weight of victualling stores, and were supplied with 1000 tons of fresh water daily, and just before their departure 150 bullocks and 100 sheep were embarked. The operation of coaling in war time is of course of capital importance, and it appeared that the resources of Toulon were inadequate. Officers and men worked with a will, the ships rivalling one another, and an average of about 200 tons was attained, which was satisfactory, considering that the fuel was in the briquette form, and that each piece had to be handled for stowage. The dockyard railways and lighters answered well until 4000 tons had been put on board the ships, but time was then lost while more was being brought from the coaling depôt, where 200,000 tons are stored, the distance being considerable and the lighters and coaling staff inadequate in number. In peace time Italians are employed, but it is thought that they will not be available after a declaration of war, and that the civil population, then diminished by mobilisation, would have to be called in to serve. Part of the difficulty in reloading the lighters appears to have arisen through a strike of men, which revealed very forcibly a weakness of organisation to which attention has since been directed.

Second period of operations.

The cruisers left Toulon on the morning of July 17th, followed a little later by the battleships, which engaged in steam tactics, and afterwards in night signalling with the Colomb and Scott systems, and by wireless telegraphy, while the cruisers were employed in the new scouting tactics for the light squadron, to which Admiral Gervais is understood to attach great importance. Like exercises followed on succeeding days, and on July 20th the fleet arrived at the Salins d'Hyères, where Admiral Gervais summoned the captains on board the Bouvet and offered a criticism of the operations. He directed particular attention to the importance of wireless telegraphy, stating that the Northern squadron was much more efficient in this matter than the Mediterranean squadron. A programme of wireless telegraphy work was afterwards laid down. On the 23rd Admiral Ménard with the battleships of the Northern squadron bombarded the batteries of the Ile du Levant, and the Marceau was said to have made particularly good practice. Other divisions of the fleet were engaged in like practice at other places, and the tactics of fire were part of the training. On the night of the 24th the torpedo-boats from Corsica and Toulon attempted an attack upon the fleet in Saint Tropez Bay, but the booms which had been prepared and the efficient patrolling, with the use of the searchlights, prevented any success. Admiral Gervais in the Hallebarde personally inspected the

lines of defence. On the 27th M. Waldeck-Rousseau, President of the Council, and M. de Lanessan, Minister of Marine, visited the fleet at La Ciotat and witnessed some evolutions, in the course of which the *Gustave Zédé*, which had already made a sensational and successful attack upon one of the battleships at Ajaccio, discharged a torpedo at the *Bouvet*, in which the Ministers had embarked.* The fleet left for Ajaccio at night, with lights extinguished in view of torpedo attack, the admiral being in communication with his cruisers by wireless telegraphy, and on the morning of the 28th there were steam tactics off the Corsican coast, which are said to have been executed with the greatest precision. A grand attack on Ajaccio was made in the afternoon, and a force was landed. The subsequent operations do not call for notice, but it is worth while to remark that during the second period of the manœuvres, the new tactical system in the double échelon formation proposed by Captain Rudolf von Labrés, of the Austrian Navy, was employed.† The adjoining diagram, taken from Captain von Labrés' book, will illustrate his particular formation, which, in various groupings and combinations, is at the root of his system.

Nothing appears to have transpired as to the opinion which the French officers formed of the Austrian officer's plans.

Commander M. Loir's criticisms.

The following criticism of what had taken place, from the pen of Commander Maurice Loir, a well-known French writer, is from the *Moniteur de la Flotte*. The manœuvres, he says, were full of very valuable instruction. In the preliminary scheme the idea was characterised by attractive largeness, and approached very near to what might actually happen in war. The intelligence and scouting service was upon an extended scale, and the semaphores and special stations, and even the consulates, took part. The results were good, but some imperfections were disclosed. The torpedo-boats of the mobile defences played a small part in the matter of intelligence, and it was seen that their range of vision was too restricted, and that it is necessary to group them with vessels much higher out of the water. The ineffectiveness of the torpedo-boats and small despatch-vessels for scouting seemed to present a decisive argument in favour of an increase in the number of scouting vessels properly adapted for the purpose. The tactical lessons are also said to have been

* For the operations of the *Zédé* during the manœuvres of 1901, see the chapter on "Submarines."

† "Die Flottenführung im Kriege auf Grund des Doppelstaffelsystems," Mittler, 1900.

valuable. The suggestion was made that the command of the fleets should be centralised, and, just as the French army has a generalissimo at its head, so should the navy have an "admiralissimo," not with a temporary appointment, as in the case of Admiral Gervais, but permanently, with the object of securing unity in the methods of naval training. The revictualling and supplying with coal and stores of the fleet at Toulon did credit to the spirit and zeal of the ships' companies, but it was shown that the port lacks material and personal resources which are indispensable. A larger number of lighters and other vessels is required, as well as of special facilities for transferring coal from the wharves to the ships. It was seen that Ajaccio was wanting in defences necessary for the protection of the squadron, while Mers-el-Kébir, as a place advantageously situated for watching the south-western region of the Mediterranean, should be made a valuable base and an important centre of defence. The ships answered all expectations, and there were scarcely any mishaps, although the fleet was not in any way spared. Everything was demanded of the ships that they could give, and they gave it. All the guns answered perfectly, and were fired with an accuracy and rapidity which testified both to the training of the men and to the quality of the guns themselves. Officers of all ranks rivalled one another in their zeal, and showed of what they were capable. It is true, says Commander Loir, that they had a marvellous inspirer of men and an incomparable chief to lead them. "By the elevation of his views and conceptions, by the ceaseless ardour which he displays, and by his exclusive love for the noble career of the seaman, Admiral Gervais has won the esteem and devoted affection of all those who have had the honour to serve under his orders."

Western manœuvres.

There were also important manœuvres of disembarkation, in which the French Northern squadron took part, in September. The Atlantique and the Médoc, of the Messageries Maritimes, were taken up as transports, and embarked infantry and artillery, with stores, at Brest, while other troops were put on board La France, of the Compagnie Générale, at Lorient. The transports left Brest on August 28th, and, being joined by La France, were escorted by the Northern squadron to Rochelle. The forts were bombarded and silenced, and the troops were successfully landed at La Pallice. They formed an invading force which took part in important military manœuvres. In all 6038 officers and men, 737 horses, and 12 guns were put ashore. It is said the transports, in approaching too near the forts with their decks crowded with men, did not preserve the right semblance of war.

GERMANY.

Importance for training.

The German manœuvres were doubtless very instructive to the officers and men of the ships, for they were rich in tactical exercises and evolutions, but little that is authentic has been published about them, and they did not include any large strategic scheme. Nominally they began on August 12th, but practically nothing of much note happened until a month later. The squadron which returned from China, consisting of the Brandenburg, Kurfürst Friedrich Wilhelm, Wörth, and Weissenburg, arrived at Kiel, after passing through the Kaiser Wilhelm Canal, in the middle of August, in order to refit, and prepare to take part in the coming operations. Rear-Admiral Geissler struck his flag, and the officer appointed for the manœuvres took the command of this force. Admiral von Koester, Commander-in-Chief at Kiel, and Inspector-General of the Navy, directed the tactical exercises.

Squadrons engaged.

The following were the forces engaged:—

FIRST BATTLE SQUADRON.—Vice-Admiral Prince Henry of Prussia.

First Division: Kaiser Wilhelm der Grosse (flag) and Kaiser Barbarossa.
Second Division.—Rear-Admiral Fischel: Kurfürst Friedrich Wilhelm (flag), Brandenburg, Wörth, and Weissenburg.

SECOND BATTLE SQUADRON.—Vice-Admiral von Arnim.

Baden (flag), Württemberg, Sachsen, Ægir, Hagen, Odin, Siegfried.

LIGHT DIVISION.

First Group: Victoria Luise, Hela, Wacht.
Second Group: Nymph, Gazelle, Niobe.

FIRST TORPEDO FLOTILLA.

Division Boat S. 101 (pennant of the flotilla commander).
First Division: S. 94 and Nos. 93, 94, and 95.
Second Division: S. 96, and Nos. 98, 99, and 100.

SECOND TORPEDO FLOTILLA.

First Division: Division Boat D. 9 (pennant of the officer in command), and Nos. 75 to 81.
Second Division: Division Boat D. 10, and Nos. 82 to 87.

Various exercises.

After a period of tactical exercises, the fleet assembled at Kiel on August 22nd, and Admiral von Koester hoisted his flag in the Kaiser Wilhelm II. The next day was devoted to coaling, and that ship made an excellent record, taking in 702 tons at the average rate of 270 tons per hour. On the 24th Prince Henry inspected the landing companies on shore, and on the 26th the fleet put to sea for a week's steam tactics, under the direction of Admiral von Koester. During the course of these operations the torpedo-flotillas made an attack, but the bright moonlight and rough sea were against them, and they failed, as might have been expected. On September 2nd the squadrons left for the east, and on the next night the boats again

attacked when the fleet was anchored off Arcona. The training seems to have been of a very practical character, and among other evolutions towing was practised. The Kaiser Wilhelm der Grosse took the Baden in tow, while the Kaiser Barbarossa towed the Württemberg, and the Victoria Luisè the Sachsen. The ships of the Brandenburg class took in tow the four coast-defence armour-clads attached to the second squadron.

Loss of the Wacht

On September 4th, while steam tactics were in progress, the two squadrons apparently performing the "gridiron" evolution, the Sachsen came into collision with the Wacht. At the moment when this happened the two squadrons were turning to reform in line ahead, and the dispatch vessel, in order to take up a new position, attempted to pass ahead of the battleship. The Sachsen's engines were immediately reversed to full speed astern, but she struck the Wacht amidships, and the unfortunate vessel immediately began to settle down. The Weissenburg attempted to take her in tow, but she filled too rapidly, and could not be brought into shoal water. Happily no lives were lost.

Final operations.

On the afternoon of September 9th the Emperor joined the squadron at Pillau, his flag flying in the Hohenzollern. He was received with an Imperial salute, and led the fleet to Hela, where it was anchored. On the next day his Majesty transferred his flag to the Kaiser Wilhelm II., and under his direction the fleet engaged in steam tactics in preparation for the arrival of the Tsar. The Russian monarch arrived on the 11th, in the Standart, escorted by the Svietlana and the Varyag, and went on board the Hohenzollern. On the next day, the fleet in a fresh formation, Prince Henry of Prussia commanding the "Blue" squadron, and Vice-Admiral von Arnim the "Red" squadron, the fleet engaged in operations upon a prepared scheme. The "Red" squadron was operating upon the coast in the neighbourhood of Danzig, in support of an army moving westward from the Vistula, and was to blockade the "Blue" squadron at Neufahrwasser. An engagement ensued, in which the "Red" squadron was unsuccessful in an attack upon its adversary, having come under heavy fire from the shore. Ships were put out of action on both sides, but it would appear that the engagement was largely of spectacular character. Another action took place on the next day, but the result is not known. It may be said that the German manœuvres, though not ambitious, were practically useful as a training for officers and men. The final scenes were designed to grace the meeting of the two Emperors, and, from a naval point of view, had little significance.

Russia.

Combined operations.

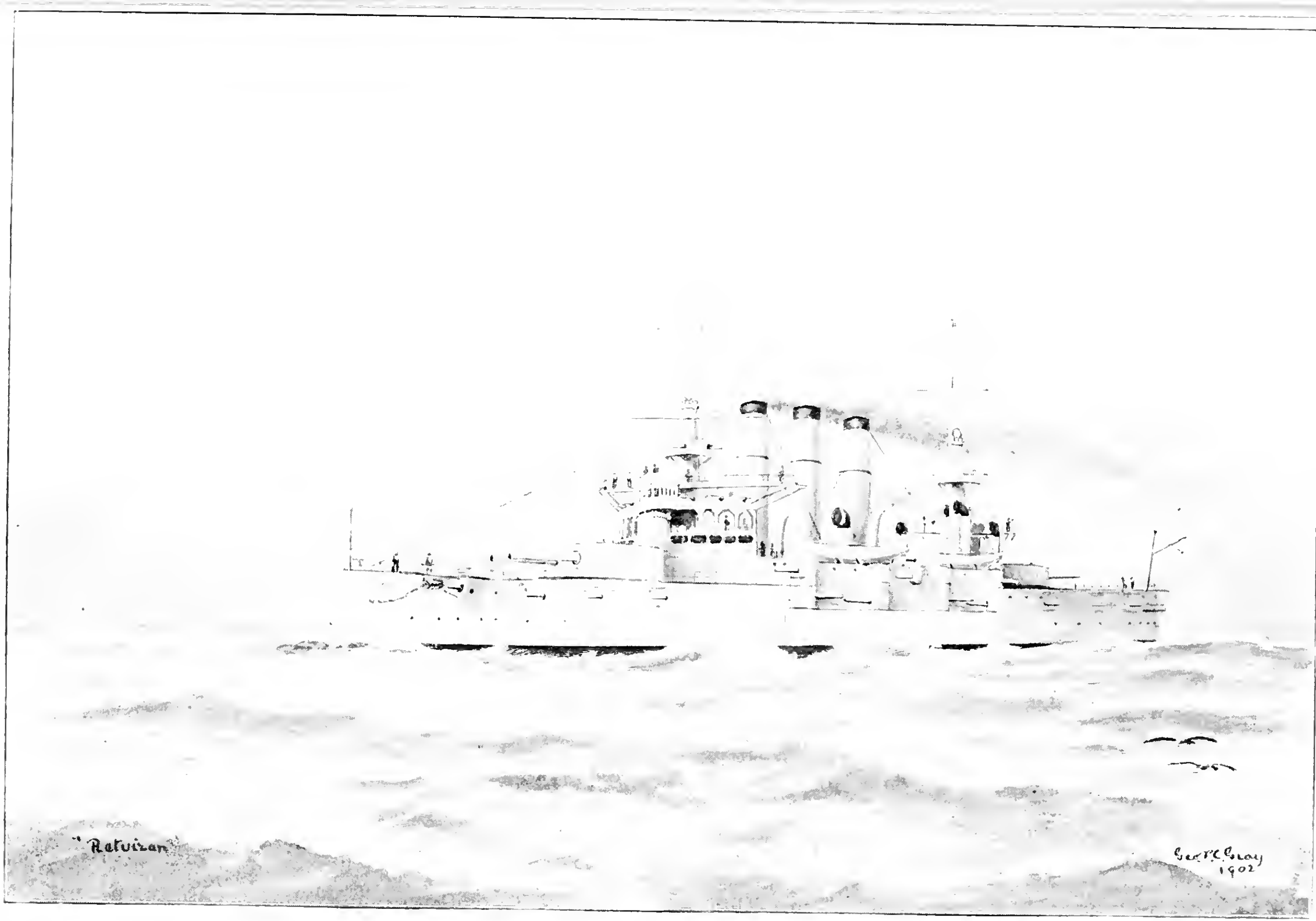
The manœuvres in the Baltic in August were of considerable importance, but their naval aspect does not merit a very long description. The operations of the fleet were combined with those of the army. A military force was assumed to have been landed at Revel and to have advanced eastward through Esthonia as far as Wesenberg on the road to Narva, with the purpose of attacking St. Petersburg, while the defending army was to cover the capital and prevent any further landings. There is no purpose of entering into the military operations here. The defenders possessed only a few torpedo-boats and patrolling vessels, and the strategical assumption was that the national squadron had suffered defeat, and that over-sea operations against the Russian capital had become possible to an enemy. The attacking fleet consisted of the coast defence armour-clads Admiral Oushakoff, Admiral Seniavin, Admiral Lazareff, and Admiral Grieg, the armoured cruisers Pamyat Azova, and Minin, the third-class cruiser Asia, the torpedo-gunboat Voevoda, and two transports, the Samoyed and Krasnaia Gorka, as well as some torpedo-boats. This squadron had assembled at Revel, where it was supposed to have covered the descent of the forces which were advancing through Esthonia upon the capital.

Landing at Björko.

While there practice was gone through in embarking and disembarking infantry and artillery, and on the morning of the 20th the 23rd artillery division and a division of the 23rd artillery brigade went on board hired transports, of which seven were Danish and one Russian. The squadron then put to sea, the Minin leading and the Pamyat Azova being astern, while the transport vessels were in two columns, flanked by the coast-defence vessels and torpedo-boats. On the morning of the 21st the squadron and convoy arrived at Björko Sound without molestation. Some torpedo-boats were driven off, and the warships opened fire upon the village of Björko. A landing was about to be made there when two Finnish regiments and a howitzer battery began to fire upon the troops. The landing was not therefore attempted at the selected position, but was made successfully at a point outside the bay. A good deal of firing accompanied the operation, and the disembarkation was accomplished with great celerity. In all, 16 battalions of infantry and 21 guns were landed. The Tsar and the Grand Duke Alexis, Grand Admiral of the Russian Fleet, witnessed the operations.

Attack on Cronstadt.

Having accomplished its object, the squadron proceeded eastward to make an attack upon the fortifications of Cronstadt. The batteries at Ishora and in other positions on the coast covered the southern



RUSSIAN BATTLESHIP "RETVIZAN."

channel. Another defensive group consisted of Fort Constantine, at Cronstadt, and Fort Milutine, half-way between that place and Ishora. There were also the batteries on Kotlin Island, and others covering the northern channel of approach between the island and Sestrorietzk, at which place landings were forbidden. In regard to this attack, the rules laid down alone seem to be of much importance. Boats could not attack with success the front of the batteries or forts at night, but an attack by the channel might succeed if they approached unobserved within less than 110 yards. If armour-clads remained under the fire of the howitzer batteries which protect the approach within less than 6000 yards for half an hour, they were to be considered as out of action. Torpedo and other boats were put out of action if they came under the fire of a single gun for three minutes, and for a shorter time if under the fire of more guns, and at night if discovered and fire was opened upon them. The howitzer batteries on shore were directed to open fire at 8000 yards, and other guns as ships came within range, which was accounted relatively short for the older guns. The booms and mine-fields were extensive, and the former were to be regarded as destroyed if torpedo-boats or pinnaces, with proper apparatus, approached them in the night unobserved, while the mine-fields were regarded as ineffective if two or more boats passed over them at night without being seen.

Useful firing practice occupied the fleet for some days. Two night attacks were made on the forts, but the details of them have not appeared. During the course of the operation there was much practice in the transmission of orders by telephone and wireless telegraphy. At the conclusion of the manœuvres the Tsar expressed his full satisfaction to the Grand Dukes Vladimir and Alexis with what had been done, and at the harmonious co-operation of the naval and military forces.

JOHN LEYLAND.

CHAPTER VII.

"THE INVASION OF ENGLAND."

The wide-spread belief abroad that invasion is possible.

It is impossible to follow the discussion of many international questions debated on the Continent without realising that there exists, in the military mind of Europe, a conviction that the invasion of England is an operation within the bounds of reasonable possibility. The belief is especially prevalent in France and Germany. It has been put forward in serious publications, and even proclaimed from his place in the French Parliament by a responsible officer who had not long before ceased to be Minister of War.* In Germany there are thinking men who hold the same faith. We have seen Baron von Lüttwitz, a prominent officer of the German General Staff, setting himself, in the semi-official *Militär-Wochenblatt*, to prove the unassailability of England to be a delusion, and assuring his comrades that it should not be a difficult thing to land troops on our shores. Another German staff officer, Baron von Edelsheim—"Operationen über See"—thinks it possible for Germany, even now, to land six divisions, including cavalry, in England. There are naval officers and writers on the Continent, like Admiral Livonius, who share the same opinion, though it is probably significant that those whose business it has been to study naval warfare, and who, therefore, have some appreciation of its conditions, do not so frequently or completely express adhesion to the view.

Conflicting views in England.

If these are things that give food for thought, there is evidently still greater cause for an examination of the subject when we see the uncertainty that clouds the conceptions regarding it of some of those responsible for the defence of the country. The most diverse opinions are held upon this vital subject, and some officers of equal eminence express convictions diametrically opposed. To some military men the invasion of these islands appears a matter of comparative ease, and the forts which have been built to command the approaches to the Metropolis would seem to be an expression of such views. Lord Wolseley has stated that "everybody whose intelligence is above the ordinary intelligence of a schoolboy must know this country is open to invasion," and has clinched the matter by saying: "When the Channel is in possession of a foreign

* General Mercier, December, 1900.

hostile navy," then, not only will it be possible, but "most certainly the country will be invaded." It would be an easy matter to give other instances from public utterances showing that the same belief has a considerable hold upon military men, though possibly only upon a minority.

Opponents of the "Invasion School."

On the other hand, many of the ripest thinkers on the question of Imperial defence declare that the Navy is the only safeguard—that by the Navy, and by the Navy only, can our shores be made secure. Though most of them will admit the possibility of raids, they hold that if the Navy should fail us our last resource would have gone, and that we should be reduced by famine without any hostile landing at all. They ask, What would avail half a million of heroes in England, eager to grapple with the enemy, if the adversary were superior at sea and could starve the country into submission without landing a single man? The existence of convictions so diverse is manifestly a national peril where the welfare, or even the safety, of the nation is concerned; and the matter is plainly fundamental, because upon the primary condition of the defence of the British Islands rests the character of all our home defensive forces, and with them of the forces which are to be the defence of the Empire at large.

The appeal to history.

The sooner, then, we arrive at a solution of this great question the better for our welfare. There has been an appeal to history on both sides. On the one, the long peace of centuries and the failures of Louis and Napoleon have been cited in evidence; on the other, the phenomenon of Hoche, the marvel of Egypt, and the adventure of Humbert. Sir Edmund Du Cane has told us that projects of invasion or raid have in many cases been adopted by solidly responsible persons, such as Marshal Saxe and Napoleon, to say nothing of such as have been formed by people now living.* To which the judicious critic may retort that neither of those eminent soldiers was trained by his opportunities or experiences to express a sound judgment on such questions, and that, though at times each cherished the desire to invade, hard facts afterwards demonstrated, sometimes by the evidence of disaster, the folly of the attempt. Certainly, on March 3, 1744, when the contemplated expedition in aid of the Stuarts was ready for the venture, Maurice of Saxe wrote to D'Argenson that the greatest obstacle which he could foresee to the success of the enterprise—an obstacle which merited all the attention of the Minister—was the opposition which might be encountered from British forces at sea. He remarked, even in that time when news travelled slowly, that he had no doubt the English

* *Times*, June 6, 1901.

people, or at least the Court, knew the French design, and would take care to make ready all their resources; and the naval officer who was in command, M. de Barrailh, expressed a precisely similar opinion, with the result that the expedition was presently abandoned.* As to the projects of the Directory and Bonaparte's invasion of Egypt, which is a most notable example of over-sea expeditions, we are fortunately, and most opportunely, helped towards a judgment by a new flood of light. The French military general staff has come to our aid. It has just issued the third volume of Captain Desbrière's "Projets et Tentatives de Débarquement aux iles Britanniques," † and has likewise published the second volume of Captain de La Jonquière's "L'Expedition d'Egypte, 1798–1801." ‡ These are volumes which merit, with their predecessors, most attentive consideration, because they contain a mass of information concerning the very question at issue.

The lessons of history—how far applicable.

It has been argued that the lessons of history have lost their value; that stupendous changes in all material things have made old precedents no longer applicable to modern conditions; that what was denied to Morard de Galles and Hoche in 1796, and to Bompard and Hardy in 1798, may be possible, perhaps, to French or German admirals and generals at some future time. There is a certain reasonableness in the contention, but it is nevertheless true that no teaching must be neglected which can be gleaned from the only real illustrations we possess of invasions of England or Ireland attempted or planned. Otherwise our enquiries will lose the essence of what we seek, and will scarcely escape the reproach of being vaguely empirical. In certain broad respects it must be recognised that projects of landing men in these islands would be both unlike and like their predecessors. They would be unlike them in that they could not have among their factors for success either a mutiny in the British fleet or a rebellion in England or Ireland, which were powerful incitements, and were regarded as essential elements in all previous enterprises against us.§ They would be like their predecessors in that the operations must be planned and organised in secret, and must depend for chances of success upon stealth and evasion, or upon the delivery of some paralysing blow, which could never be effectual if our fleet were

* "Louis XV. et les Jacobites," by Captain J. Colin, 1901. (Chapelot.)

† R. Chapelot et Cie., Paris.

‡ Henri Charles-Lavauzelle, Paris.

§ General Hmubert, weary of the fruitless attempts that had been made, wrote to the Minister of War on May 29, 1801, again offering his services, and declaring that 8000 or 10,000 men landed in Ireland would suffice to capture the island from Great Britain. "Let us be persuaded of a truth; it will never be with a strong army that we can operate with advantage; it must be with 100,000 Irishmen or 100,000 Scotchmen that we subject the pride of that Power and avenge the *Patrie*."

prepared. If so much be admitted it may seem reasonable to conclude that those attempts to land men on our shores are most likely to succeed which are planned upon the smallest scale—that the raid is more to be looked for than the invasion in force.

Vagueness and instability of hostile plans.

Long before the notorious attempts at the end of the 18th and beginning of the 19th centuries, the notion of invading England had buzzed in the brain of France. As is remarked by Colonel Krebs, lately chief of the historical section of the French General Staff, in an introduction to Captain Desbrière's book, the idea of carrying war into the British Islands was part of the traditions of the French monarchy. The operation had been intended by Louis XIV., and had been the subject of numerous projects under Louis XV. and his successor. Later on, in the time of the Directory, one egregious person, a certain Desfrieches, an artist of Lisieux, proposed to despatch an army of 73,440 men, apparently with guns, horses, and stores complete, on a sort of floating entrenched camp towed by frigates. Other fantastic projects were numerous. Even Hoche, early in 1796, with Humbert and La Barollière, despairing of conquering us by force, thought it desirable to organise what he called a "Chouannerie" in England, like that of which he had had so much experience in France. It is creditable to Captain Desbrière that he says approval cannot be given to the methods proposed, although he seems to think that the exasperation at our conduct explained the very singular idea. The "Chouannerie" in question was a species of brigandage; the jails were to be emptied and deserters gathered together, to be landed on the south coast, in Cornwall or Devonshire, or in Wales. As may be remembered, this villainous idea was partially carried out in what is known as the Fishguard invasion under Tate, which ended so absurdly. Hoche thought the individuals gathered were of such an order that they might be trusted to do some desperate damage, and he suggested as most likely pillage and assassination. He had seen it in his own country. "Que sera-ce en terre étrangère!" La Barollière thought the best plan would be for the brigands to attack and pillage all public conveyances, to seize public property in towns and villages, to preach "la guerre aux châteaux et la paix aux chaumières," to open prisons and to arm the convicts, and to burn everything that concerned the navy; while they spoke much of liberty, but had only the purpose of destroying, "et point d'édifier." Every individual who became a *chouan* in England was to be encouraged to rob to the extent of 100,000 francs, in order that he might "end his days in comfort." The fact that this benevolent project engrossed the attention of Hoche certainly up to June 19, 1796, and that before the end of the month he had welcomed and was organising a plan projected by the Directory

of making a landing in Ireland, may serve as an indication of the instability of his plans, and of the insensate Anglophobia which impelled him to vain adventures.

Confidence of French soldiers explained.

What is very singular and even marvellous in the projects of the time is the blind confidence, even of highly-placed French military officers, in their ability to strike us at home, and in their comical faith that a superior naval force was a thing not to be taken account of. The phenomenon, however, is capable of explanation. The military officer did not think it his business to organise or safeguard the transport at sea. It may be suspected that with some secret satisfaction he viewed with pleasure the very awkward situation in which his careful projects placed his friends in the navy. It was enough for the soldier to organise an army, to plan its operations when it should be landed, and to measure the resistance it would be likely to encounter. That done, he had accomplished his task, so far as preparation could go, and looked to the seaman to make possible its execution. The seaman, brave and loyal enough, would not be a whit behind his comrade in zeal, energy, or enterprise, but a terrible task was before him. He was on the horns of a dilemma. Either he must risk all or be condemned for failure. "Poor Morard de Galles!" said Hoche; "he is already twenty years older. How I pity him!" At a later date, fretting under the fetters of our command of the sea, ill-fated Bompard wrote that he was prepared to risk everything. The dangers were enormous, but, if they would relieve him of responsibility, he would dare all. The fate of his final temerity is well known. Not all the sea officers shared his intrepidity. There were some who foresaw disaster too plainly inevitable, and who, by word or deed, discountenanced the project—for adopting which attitude they incurred the bitter scorn of the soldier, and have fallen under the heavy censure of the publicist.*

Villaret-Joyeuse and Hoche to proceed by stealth.

Villaret-Joyeuse was to command the naval forces in the expedition to Ireland, and the secret instructions issued to him are very deserving of note, being just as applicable to-day as they were in 1796. They expressed the opinion of the Directory that it was of the utmost importance that the expedition should be hidden from the eyes of the English, and that any engagement whatever should be avoided; because, however successful might be its issue, it would necessarily be destructive of the very purpose

* Hoche wrote in his bitterness: "What is the Navy? The problem is to discover. God forbid that I should have to do with it! What a miserable concern! A great body, of which the parts are disjointed and disunited; contradictions of all sorts indiscipline organised in a military body. Add to this proud ignorance and stupid vanity, and you will have the thing complete."

of the enterprise.* The conditions were indeed most unpropitious for the adventure. Villaret had, or was imputed to have, his mind fixed on a long-planned expedition to India, and to be more than lukewarm in his purposes against Ireland. The latter was probably true, and Adjutant-General Simon told Hoche that the admiral had written to the Minister declaring that the Irish project was foolish and impracticable, and that nothing would make him proceed on such an enterprise. The recriminations between Villaret and Hoche were most bitter, and finally the unfortunate admiral was removed from his command, with the added indignity that his adversary was empowered to choose his successor. That successor was Morard de Galles. We thus see how naval opinion was over-ridden by military rashness, and the degree of that rashness may be measured by the fact that, failing a squadron, Hoche was ready to proceed to Ireland with a single frigate. The conduct of the business fell into his hands with the appointment of Morard de Galles. That officer wrote to Truguet, the Minister, a pitiable letter in which he deplored his physical and mental incompetence in terms that remind us of the self-depreciation of Medina Sidonia before the expedition of 1588.† His appointment was the opportunity of Hoche, who wrote a note concerning him: "Another victory! M. de G. accepts. He is the very man for the business. If his eyes are feeble we will see for him!"

Great delay occurred in preparing the expedition, and it was not ready until the month of December, though it had been definitely planned as early as June 19, when Hoche had been informed that he was "to give to a generous people, ripe for revolution, the independence and the liberty they claimed." Constant difficulties arose, and, though Bruix had been optimistic in his view as to the preparedness of the fleet, it was found that seamen were wanting, and that the collection of stores was slow and difficult; while further delay was caused by the expectation of the arrival of Admiral Richery with a reinforcement, and symptoms of mutiny and rebellion had appeared in the fleet. At last, with something under 14,000 troops on board, of whom 633 were lost owing to steps taken to avoid the British fleet, the expedition got under way from Brest on December 15, just

Hoche's expedition.

* On March 24, 1804, Napoleon expressed the same view in a telegraphic order to Ganteaume, who announced that his squadron was ready to move from Brest, but could not do so without risking an action. "Une victoire navale dans cette circonstance ne conduirait à rien."—Correspondance, No. 8480.

† Morard de Galles to Truguet, November 9, 1796: "I must tell you that I possess none of the qualities necessary in a good general. The bad state of my health and the pain and grief which I have undergone have notably affected my mental faculties, and the weakening of my sight, which scarcely enables me to distinguish objects at the distance of four paces, opposes an invincible obstacle to my directing the manœuvres of a squadron."

two days before the Directory expressed a change of mind and contemplated some other project altogether. It was too late, however, to recall the strangely constituted squadron, with the divergent elements it carried, and it proceeded through extraordinary perils, and, by a marvel of good luck, reached Bantry Bay. Those who wish to read the long story of the difficulties and misfortunes that befel the expedition should read Captain Desbrière's book. An enterprise embarked upon in such conditions appeared inevitably foredoomed to failure. Wolfe Tone described how they lay in Bantry Bay expecting at every minute a visit from the British. The force had become divided, and there were only 6500 soldiers, without a guinea, or a tent, or a horse to drag their four guns. Morard de Galles and Hoche, in the frigate Fraternité, separated from the main body, had fled, under every inch of canvas the ship could carry, from a British vessel, having thrown some of the guns overboard; and so they were not with their friends in Bantry Bay.

So desperate appeared the situation of some of the Frenchmen there that Rear-Admiral Bouvet, who commanded a division of the squadron, is declared by Grouchy to have wished to return to Brest lest the squadron should be blockaded by the British; and the other admirals, Nielly and Richery, for reasons which we may suppose to have been analogous, attempted nothing to further the operations. Wolfe Tone became discouraged, and declared the expedition to be impracticable; for the weather had grown very bad, and he protested, when they were reduced to seven ships and a frigate, that any attempt to land would be an act of despair, though he thought a disembarkation in the Shannon would have had chances of success. The committee of enquiry into the lamentable failure ascribed as reasons for it the improbability of a large assembly of the forces, the risk of blockade by the weather or by the English, the want of food, which would have necessitated the immediate return of the ships, and the news that 5000 British troops were ready to oppose a disembarkation, while it was believed that six of our ships were at Cork. These considerations had determined the commanders to return to Brest.

Foredoomed to failure.

Such an expedition does not merit the name of an invasion. It could at the best only have been a raid. If complete success had attended the landing, it would have ended in defeat and disaster, like the subsequent expedition of Humbert. The forces had no money, stores, or means of transport, and these were not to be found in the wild south-west corner of Ireland, and Grouchy's decision not to disembark was doubtless dictated by sound considerations. In England we have been apt to speak of the near success of Hoche's

expedition; but the truth is, as the late Admiral Colomb pointed out, that to the French it was rather the vicinity of a failure very much greater than that which they actually experienced. Those who returned could only have been thankful that it was no worse, and subsequent experience must have confirmed them in that opinion.

There was a subsequent project of landing 70,000 men in England—the fleets of France, Spain, and the Batavian Republic being allied to accomplish the enterprise in 1797. But all hopes were crushed by the great victory of Camperdown, concerning which Captain Desbrière's remark is worthy of note, though it does not explain the whole fact—that the principal cause of failure was want of co-ordination between the allied fleets of our enemies. Bonaparte, who was a very short time in command of the "Army of England," had arrived at the conclusion in February, 1798, that to make a descent without being master of the sea was the most rash and difficult operation that could possibly be; and he thought—though his plans often changed—that the right moment for preparing an expedition had been lost, perhaps for ever. It was an enterprise, at least, that promised nothing to his personal glory, and he turned to the plan of invading Egypt, being quite willing that other generals should have charge of the unpromising projects against the British Isles.

The enterprise of 1797.

Much has been made of the expedition to Egypt by those who regard it as a great example of over-sea operations. But the truth is that there is no analogy between the French landing at Alexandria and an invasion of England. What resemblance can there be between the enterprise of Bonaparte and that of a commander who should attempt a landing upon our shores? In one case we find Nelson preparing to thwart the purpose of the enemy, and triumphantly endeavouring with that object to reassert our sea power in the Mediterranean, but doing so without adequate force, without frigates to be the eyes of his fleet, without bases for his supplies, and with many of his resources to create. In the other case, we should have the fleets and flotillas of an enemy in our own waters, within the immediate range of our cruisers, and within striking distance of our strongest forces, undertaking an operation beside which those of the 18th century would sink into insignificance. To use the analogy of the invasion of Egypt as a sanction for the plan of invading England is to cloud the argument and make a false and dangerous historical deduction, which, if it should sway our counsels, would have far-reaching consequences, leading to a great misdirection of national effort and resources. Let it be recognised that the expedition to Egypt was an enterprise contrary to the plain teachings of war. It was a remarkable illustration of the imagination, the enterprise, the

The expedition to Egypt.

intrepidity, and the moral courage of Bonaparte; but it can add nothing to his military glory, for at every stage of its sea progress it was within an ace of gigantic catastrophe; its ill-starred course was shadowed by imminent disaster, and culminated in lamentable failure. Its justification may be sought in the occupation which the attempts of Hoche and Humbert were assumed to have given us at home, and in the fact that it was planned and initiated at a time when we had temporarily abandoned the Mediterranean, and when the pathway to Egypt seemed open.

A dangerous adventure.

We have only to read Captain de La Jonquière's graphic pages to discover how extreme was the danger, and how imminent the peril, that overhung that unwieldy fleet and vast transport, stealing away from Malta and in daily dread of a sight of a sail or the rising of a storm. Those on board the French ships who realised the situation felt that the sword of Damocles was hanging over them. Sulkowski, who was in a good situation to learn the ideas of Bonaparte, wrote that the success so far attained had not in any way diminished the critical state in which the French lay in relation to their superior enemy, if he should appear upon the scene, forcing them to fight with their vessels encumbered with baggage and military stores, and having the painful duty of défending an immense and incoherent convoy, which twenty days of navigation had shown to be as incapable of unity as it was of flight. "Speed, discretion, and the winds could alone give success to this expedition, and we abandoned ourselves to the last." It is well known that when the French arrived off Alexandria on July 1 they were amazed to find that Nelson had been there before them. Vivant Denon, who was on board the Junon, which was sent ahead to communicate with the French consul at Alexandria, learnt that the fleet of Nelson had left the very day before he reached the port. In these significant words he describes the situation: "The presence of the English had shadowed our horizon. When I remembered that three days before we had deplored the calms which held us back, and that without them we should have fallen amid the enemy's fleet, to which ours would have been discovered, I vowed myself thenceforth to fatalism, and commended myself to the star of Bonaparte." The possibility that Nelson might return caused an immediate change in the plans of Bonaparte, and he ordered an instant disembarkation of the troops. "When we arrived before Alexandria," wrote Sulkowski, "the urgency of the peril, and the presence of a formidable enemy on the coast, left no choice in the measures to be taken." The troops were therefore precipitately put ashore, while the squadron, unable to enter the port, and fearing to take refuge at Corfu,

proceeded to Aboukir Bay, there to await the onslaught of Nelson. Such was the landing in Egypt, which ended, as all the world knows, in the destruction of a fleet and the surrender of an army. Is it reasonable to take such an enterprise as a light to guide us in our military policy? Can we regard the adventure of Bonaparte as the historical sanction for an invasion of the British Isles?

Later expeditions.

A brief glance at the later expeditions to Ireland shall conclude this enquiry into the historical evidences of the subject. The Irish Rebellion had taken the Directory by surprise; but it was too good an opportunity to be lost, and between May and October, 1798, not less than seven expeditions were planned, of which six were prepared and five put to sea, two being disastrous and two useless, while only one attained a temporary measure of success. It was still hoped to gain the help of the Dutch, who had not yet recovered from the disaster of Camperdown, and Admiral Bruix, who was confident, was strong in his urgency. But Admiral Spoors, the Batavian Minister of Marine, attempted to check his ardour, telling him the British Fleet off the Texel presented an insurmountable obstacle, and that even if an expedition should put to sea, it would be pursued and destroyed. His words were justified a little later, when two Dutch frigates which made the venture fell in with the British and were captured.

Sea power the obstacle.

It is necessary to point out that the various expeditions were really part of a single operation. It was impossible for the French, owing to the pressure of the British Fleet in the Channel, either to assemble their forces in any one port or to co-ordinate their efforts. Thus our sea power imposed a grave disadvantage at the very outset, and in the end prevented the general plan from being put into execution at all as a united and consistent endeavour. Independently of the Dutch expedition, there were two other parts of the plan involving preparations at Brest and Rochefort, where the troops were respectively under command of Generals Hardy and Humbert, and the squadrons under Admirals Bompard and Savary. Continual delays occurred, and Chérin, who was the General-in-Chief, disgusted with the disordered authority, thought his position untenable, and retired, summing up the situation in the sentence, "Tout est prêt; rien n'est prêt." As to the Brest expedition, it could not put to sea at the time, and the brunt of the business fell upon Humbert and Savary. The instructions to the latter were like those given to Villaret-Joyeuse two years before, and to Ganteaume later on, in the particular direction that he should hide himself from the view of the British. He was the better able to do so because he had only three frigates with him, carrying 1100 soldiers. Those who would know the details of his expedition, of his landing, and ultimate

surrender will find much information in Captain Desbrière's book, as also in the pages of Lecky, and in M. Gribayédoff's "The French Invasion of Ireland," published in New York in 1890. Humbert's expedition was a gallant, but almost puerile attempt to take advantage of a rare opportunity, and its measure of success was in inverse ratio to its scale.

Bompard's disaster.

It deserves to be noted that the Anacréon brig escaped from Dunkirk on September 4, 1798, having Napper Tandy on board, and that after a strange odyssey it arrived with him at Bergen, in Norway. As to the expedition of Bompard and Hardy from Brest, it was subjected to constant delay, and drove the gallant seaman almost to desperation. Just when the wind became favourable the British ships appeared, and when he sought to go out by the Black Rocks he was attacked on August 20, and, having suffered some damage, returned. It was not until September 9 that he found a chance of slipping out, with semi-mutinous troops on board. The fate of the expedition is well known. According to the normal course of naval warfare, it was discovered by British frigates, pursued, and ultimately brought to action off the Irish Coast, where it was completely defeated on October 12 by Sir John Borlase Warren—a very striking example of the fate of expeditions of the class. On the very same day Savary left Rochefort for his second expedition, being then in ignorance of the fate of Humbert, whom it was intended to relieve. Reaching Killala on the 27th, he became terrified at the risks that were being run by sea and land, cut his cables, and made the best haste he could to return, having thrown overboard a large part of his ordnance, and several of his ships being dismasted. It is the opinion of Captain Desbrière that Bonaparte was not in earnest in his projects against Ireland in 1804. The country was more settled, and he could not look for revolution to justify an enterprise.

Enough has now been said concerning the various projected invasions of these islands which have occupied the attention of French soldiers and seamen, though the history of the Boulogne Flotilla is interesting and instructive enough. Those who would understand the inner history of these attempts, the effect of the constant pressure exerted by our fleet, the manner in which it affected the enemy's plans, the clumsy endeavours that he put forward, the confusion and uncertainty that were caused, the quarrels and bitterness that ensued, and the rashness of spirit that was begotten of the conditions imposed, will find profound instructions in Captain Desbrière's most interesting pages, and not less concerning the Egyptian expedition in the work of Captain de La Jonquière.

It is impossible to imagine anything more remarkable in the way of projected invasion than Hoche's abortive expedition; anything more rash and perilous than the expedition to Egypt; anything more complete in its failure than the adventure of Bompard. It has perhaps yet to be explained how it came to pass that the ships conveying the expedition of Hoche should have been able to anchor in the bays outside Brest, and then to put to sea without being discovered or pursued. As Admiral Colomb pointed out in a discussion of this subject, if we separate the personal from the material element in these cases, it becomes plain that what secured Bompard's defeat was the supply of a sufficient number of frigates to observe him; and what secured Hoche's escape—and I may add that of Bonaparte—was the paucity of these necessary adjuncts to any efficient blockading operations. In other words, what secured our success in the case of Bompard was completeness and sufficiency of resources. There is surely a lesson to be drawn here. If our fleets are insufficiently provided with cruisers—the modern representatives of frigates—as there is excellent reason to believe, let them be provided forthwith; and if in other respects there is anything wanting to our efficiency, let it be instantly made good. For it is useful to remember that, with complete efficiency in every essential respect, both Hoche and Bonaparte would have shared the fate of Bompard. Comments.

These are salutary lessons, but they are not the only, nor indeed the greatest lessons, to be drawn from this survey of attempted invasion. What we see most conspicuously is that descents upon the British Islands, attempted or undertaken, have been in the past always completely or proximately unsuccessful. If they were small, convoyed in a few ships to be counted on the fingers of one hand, they had a chance of success, if fortune should favour them in their game of evasion. The larger the scale of preparation, the greater grew the danger and the nearer the imminence of catastrophe. It must always be so. Evidently in these days great over-sea expeditions in the presence of hostile naval forces are impossible. It has been contended that the introduction of steam has conferred an immense advantage on would-be invaders, but manifestly the gain to defenders is still greater, and the telegraph is a powerful weapon in their hands. It has become easy to cover the sea, by means of swift vessels fitted for wireless telegraphy, with a network of observation. If, in former times, no great expedition could be prepared without the rumour of it reaching English ears, in these days the certainty of our knowledge has become absolute. Not in any port of the Continent can a great army be collected, with the Prospects of success in invasion or raid.

vast transport required for its conveyance, without ample warning reaching the British Government.

Mislead-ing arguments. Those who have supported the idea that we are open to invasion have sometimes put forward the plea that the British fleet might be lured away or be deceived into undertaking some useless operation. As reasonable men, we cannot base our policy upon such an hypothesis. We must take our stand upon rational considerations. We do not contemplate the possibility of the Army being in some place where it ought not to be. Why should we attribute such folly and mismanagement to the Navy? We must, moreover, take account of the consideration already suggested—that no enemy has ever ventured in modern times to invade our shores without counting upon receiving powerful aid from a large section of the people, and that now a united people, strong with a larger patriotism, presents an unbroken front and an insurmountable barrier to hostile ambition.

The object I have had in view has been, by the light of the researches of French official historians, to show how ill-founded have been the many attempts made against us.* I should do injustice to these officers if I gave the impression that this is their view. As official writers it scarcely could be. On the contrary, they suggest that if the expeditions had been better managed, they would have had good chances of success; to which, of course, it might be replied that if our operations had been better combined, they would have had no chances whatever. And I believe that an attentive perusal of their pages will convey the latter view with cumulative force—arising from their detailed description—which this general survey cannot give. It may be admitted that they have shown the possibility of raids being effective, if it should be thought worth while to attempt them.

Conclusions. In conclusion, let us grasp the essential lesson—that invasions in force can never be accomplished "if England to itself do rest but true," and we do but see to it that our fleet is what the Articles of War declare it to be—that force upon which, "under the good providence of God, our wealth, prosperity, and peace depend." A nation without a policy in the matter of defence is in a parlous state. Such a condition has given to France what one of her most prominent admirals described as "a fleet of samples," and to Italy what an Italian Minister of Marine spoke of as a fleet worthy of a naval museum.

We have a vast empire to protect, and the fleet will enable us to do that effectually as the over-sea shaft of that lance of which the

* Capt. Chevalier, in his "Histoire de la Marine Française depuis les Débuts de la Monarchie" (1902), remarks, in relation to the invasion projected by Louis XIV., that Tourville felt the complete inanity of the plans, in which little account had been taken of the naval and military difficulties that would attend the execution of them.

Army is the head. This may, perhaps, appear to some scarcely the right place in which to speak of military policy. Yet the sufficiency of the Army for its duties and its organisation for war are fundamentally related to the sufficiency of the fleet and to the subject of this chapter. It is universally admitted that, whatever force is maintained within the kingdom, we must have a foreign service army. Our home forces must be constituted as the base and feeder of the foreign service troops, and there must be no vast outlay either on men or inland works for the defence of these isles, the fleet being made supreme. It is an obvious consideration that however powerful may be the forces we maintain in readiness for foreign service, they cannot be despatched from our shores until the fleet has made the sea secure for their transport. Thus—if we admit, for the sake of argument, the possibility of a naval catastrophe—there will always be plenty of trained men in the United Kingdom. In that same hour in which the fleet makes it possible for them to leave our shores, no chance of the violation of the kingdom by invasion will remain. The true lesson of this inquiry is, therefore, that a sufficient and efficient Navy is the essential factor in national as in Imperial defence; and that, recognising this cardinal principle, we are able to formulate a sound military policy, and to direct national efforts and resources to the true and direct end.

JOHN LEYLAND.

CHAPTER VIII.

Submarines.

In the past issues of the *Naval Annual* brief reference has been made to the more important of the submarine vessels which have been constructed in recent years. It is proposed in this chapter to present a short review of the progress and development of vessels intended for use below the surface or awash, without entering into any discussion as to the value of such submarines in naval warfare.

David Bushnell, at the close of the 18th century, invented the first known torpedo and the first submarine boat of which any detailed account is extant. Since his day innumerable craft capable of subsurface navigation have made their appearance. Once only, however, has a vessel of this description accomplished anything in actual warfare. During the American Civil War, one of the "Davids" constructed by the Confederates succeeded in blowing up the Federal frigate Housatonic, and in destroying itself at the same time. Since then French submarines are reported to have succeeded in blowing up battleships in mimic warfare. What these machines will do in the next great naval battle can, in the present state of the science of submarine navigation, be only a matter of conjecture.

Great Britain.

Five boats, programme 1901-1902.

In the autumn of 1900, the British Admiralty ordered from Messrs. Vickers, Sons & Maxim, the European agents of the Holland Torpedo Boat Company, five vessels of the newest type invented by Mr. J. P. Holland. In January last, Mr. Arnold-Forster, in the House of Commons, explained that when the decision to construct submarine boats was arrived at, only one type of boat was available for purchase, that the right to build boats of this type was in the hands of one firm, and that it was therefore necessary to entrust the work to that firm. A brief account of this type, the tenth invented by Mr. Holland, was given in last year's *Naval Annual*. The boat is cigar-shaped; length, 63 ft. 4 in.; beam, 11 ft. 9 in.; and displacement submerged, 120 tons. The hull is circular in cross-section, and is divided by two water-tight bulkheads into three separate compartments. The motive power for use when not submerged is a 160-H.P. single-screw four-cylinder Otto gasoline

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THE FIRST BRITISH SUBMARINE.

[Reproduced, by permission of the Admiralty, from a photograph taken by Messrs. Vickers, Sons and Maxim, Limited, Barrow-in-Furness.]

engine, capable of giving a speed of 8 knots on the surface. Submerged, the propelling power is a 70-H.P. electric motor, giving a speed of 7 knots when awash or totally under water. The radius of action at the surface is about 400 knots (the gasoline tank being of 850 gallons capacity), and the storage batteries have sufficient capacity for a speed of 7 knots on a four-hours' submerged run. The storage batteries can be charged by the gasoline engine running the electric motor as a dynamo when the vessel is at the surface. The armament consists of one torpedo tube forward. Five torpedoes are carried. As each torpedo is fired, water is admitted to special tanks in order to compensate for the loss of weight. In diving, the boat is brought to the awash condition, with only the conning-tower ports above the surface, by the admission of water into the the three main ballast tanks. The method of submersion by the drawing in of cylinders (adopted in the Campbell-Ash boat) has been abandoned in all modern craft. For complete submersion the boat is steered below the surface by means of a pair of horizontal diving rudders at the stern. She dives at a small angle, and is brought to a level position either automatically or by hand. Mr. Nordenfelt, it may be noted, expressed the opinion that a submarine boat could only be submerged on an even keel. All modern craft, however, go under at an angle. The Holland boats are lighter than the weight of water displaced, and consequently they have a tendency to rise or sink at the smallest provocation. One of the main drawbacks hitherto to the utility of submarines has been their lack of longitudinal stability. In order to counteract this, two trimming tanks and one circular compensating tank are provided, whilst the horizontal rudders are controlled by apparatus similar to that found in the Whitehead torpedo. As the boats are unable to withstand the pressures of depths exceeding 100 feet, automatic means are provided to prevent them from passing the dangerous limit. For air supply and ventilation, tanks, in which air at 2000 lbs. to the square inch pressure is stored, are provided. It may be remarked that experiments are reported to have been made in the French submarine Morse with a chemical substance (discovered by M. Georges Jaubert) of comparatively light weight, which in one single operation can not only completely remove from vitiated air the carbonic acid, water vapour, and other non-respirable products, but can also automatically restore to it the exact mathematical quantity of oxygen which it lacks. In other words, the substance, when placed in contact with air vitiated by respiration, can completely regenerate it and restore to it its original qualities.

The first British submarine was launched on November 2, 1901,

at Barrow, without any ceremony, though representatives of the Admiralty were present. No. 2 was launched on February 21, 1902. It was stated that certain alterations had been rendered advisable in its construction by defects which had been discovered during the testing of No. 1. The trials have been carried out under the direction of Captain Reginald H. S. Bacon, D.S.O., who was appointed in August, 1901, to the command of the Hazard, which was specially commissioned for service with the Barrow submarine flotilla. Before launching, No. 1 was, by means of a floating dock, placed on the gridiron. A crew of six men was put on board, and she was then hermetically sealed for three hours, air being supplied from the compressed air cylinders. The trial was reported to be successful, the men suffering no inconvenience. On her first sea trial No. 1 started from the gridiron and proceeded along the Devonshire and Buccleuch Docks, and back to her moorings; her machinery is reported to have worked smoothly, and the boat to have realised all the expectations of her designers. On subsequent trials she is said to have attained a surface speed of 10 knots. The first submersion trials of No. 1 were carried out on February 5, 1902. She went under water with some officers of the Hazard on board, and again most satisfactory results were reported to have been obtained. Her appliances for purification of air were used to maintain atmospheric conditions, without any need of her cylinders of compressed air.

Mention may be made here of some experiments in destroying submarines witnessed by the Lords of the Admiralty in June, 1901. The trials were secretly conducted, at a considerable distance from shore, but the following is summarised from reports which appeared in several papers. The submarine to be attacked consisted of a barrel sunk some ten feet below the surface. This was attacked and destroyed by the torpedo boat destroyer Starfish. On the starboard side certain plates had been strengthened, and above there was a crutch on which worked a spar torpedo, consisting of a stout pole 42 ft. long, at the end of which was an explosive charge of 32 lbs. of wet gun-cotton. Normally this boom stows inboard and forward, but on going into action it is slung out well forward and immersed in the water at the proper moment. This immersion carries the boom end downward and aft, and the charge is exploded directly the submarine is passed. It is thought that the speed of the destroyer will carry her past the centre of the explosion before the full effects can reach her, and that the submarine, if within 50 to 100 ft. of the explosion, will have her sides compressed to such a degree as to cause fatal leaks. The officers who carried out the experiment are

reported to have said that any submarines within an area of 60 ft. of the outrigger boom of the Starfish when the explosion occurred, must infallibly have been annihilated by the bursting of the charge, and that if a submarine came up within a thousand yards radius of a boom-fitted destroyer it would certainly be done for.

Four boats, programme 1902-1903.

The Navy Estimates for 1902–1903 provided for four more submarines. Details of these boats have not been made public. It is believed, however, that they will be 100 ft. long, and will embrace some new departures in design and construction, based on the experiments already made.

France.

For convenience French under-water craft may be divided into two classes—the Gustave Zédé, or "submarine" proper type; the Narval, or "submersible" type: the latter are able to recharge their accumulators whilst at sea.

Sub-marines proper.

It was in the year 1886 that Admiral Aube, then French Minister of Marine, ordered from the Société des Forges et Chantiers de la Méditerranée the first submarine vessel for the French Navy. The original plans were worked out by M. Dupuy de Lôme, and after his death they were modified by M. Gustave Zédé. This vessel, the Gymnote, was launched in September, 1888. She is 55 ft. 6 in. long, 5·9 ft. beam, and displaces 30 tons. Her sole motive power is electricity, and her maximum speed about 6 knots.

Gustave Zédé.

The Gymnote being intended merely as an unarmed experimental craft, M. Barbey, when Minister of Marine, ordered M. Romazzotti to draw up the plans for a larger vessel, to be named the Gustave Zédé. She was launched on June 1, 1893. Her dimensions are: Length, 159 ft.; beam, 12 ft. 4 in.; and displacement, 266 tons. The first journey of any length undertaken by this boat was from Salins d'Hyères to Toulon. Since then she has journeyed from Toulon to Marseilles, 41 miles, and from Toulon to Ajaccio. Like the Gymnote, she depends entirely on electricity for her motive power.

Morse.

Before the Gustave Zédé was completed, M. Romazzotti prepared designs for a submarine which should be intermediate between the Gymnote, displacing 30 tons, and the Gustave Zédé, of 266 tons. This vessel, the Morse, was launched at Cherbourg on July 5, 1899. She is 118 ft. long, 9 ft. beam, displaces 144 tons, and her sole motive power is electricity.

The Farfadet class, designed by M. Maugas, consists of four vessels, all laid down simultaneously at Cherbourg on September 27, 1899: Farfadet, launched May 19, 1901; Gnome, Korrigan, launched

February 2, 1902; and Lutin. In size they are between the Zédé and the Morse, the measurements being: Length, 135 ft. 8 in.; beam, and also draught, 9½ ft.; displacement, 185 tons. Each boat has a single screw, and the sole motive power is electricity supplied by accumulators. On the surface the speed is to be 12·25 knots, and submerged 9 knots. The complement is a lieutenant and eight men.

Two sister vessels, the Français and the Algérien, designed by M. Romazzotti, were laid down at Cherbourg in 1900. They were built with the proceeds of a subscription raised by the *Matin* at the time of the Fashoda dispute. They are practically identical with the Morse. The Français was launched on January 29, 1901, and the Algérien on February 15, 1901. In a recent article in the *Figaro*, M. Calmette reported that the Français and the Algérien could recharge their accumulators whilst at sea by means of a "combination of motors." Details of this arrangement have not been made known.

"Submersibles."

In February, 1896, M. Lockroy, Minister of Marine, invited designs for a submarine torpedo boat. The design of M. Laubeuf was chosen. This vessel, the Narval, was laid down at Cherbourg in 1897. She was not launched, however, until October 26, 1899. Whilst the Gymnote, the Gustave Zédé, and the Morse rely solely on electricity for their motive power, and thus have a narrow radius of action, the Narval is propelled on the surface by a steam engine fed with liquid fuel, and under the waves by an electric motor. To this class the name "Sous-marin autonome à grand rayon d'action" has been given by some writers. In designing the Narval, M. Laubeuf aimed at producing a disappearing vessel which should correspond with the sea-going torpedo boat, just as the Morse was designed to replace the torpedo boat for coast defence. The dimensions of the Narval are as follows: Length, 111 ft. 6 in.; beam, 12 ft.; draught 5⅓ ft.; displacement, (light) 106 tons, (submerged) 200 tons. The Narval has two hulls; the external hull is pierced with holes above and below and at the two ends. To bring her to the awash position, sea water is allowed to enter and to circulate freely between the two hulls, the idea being to protect the inner hull from small projectiles. This operation at first took about a quarter of an hour, as the funnel had to be unshipped, all the openings had to be hermetically closed, and sufficient time had to elapse for the unused steam to cool down and the air to be cleared of the hot gases. In some of the newer boats of the Narval type the time required to come to the awash position has been reduced to about five minutes. The motive power on the surface is a triple-expansion steam engine developing 250 I.H.P. The boiler is tubular, and five liquid fuel

furnaces supply the heat, heavy petrol being injected. Submerged, she is driven by an electric motor, the current being supplied by 158 Fulmen accumulators. The Narval has the following radius of action :—

Surface,	252 miles at	11 knots for	23 hours.	
„	624 „	8 „	78 „	
Submerged,	25 „	8 „		
„	72 „	5 „		

She is steered below the surface by four horizontal float-board rudders arranged symmetrically on each side of the hull, two near the bows, and two near the stern. The armament consists of four above-water Drzewiecki holders fitted with 17½-in. Whiteheads. Narval.

In May last the Narval went from Cherbourg to St. Malo and back again in heavy seas. She was navigated for 40 hours without stopping, covering 260 miles at an average speed of 6½ knots. During the trip she remained below the surface for several hours at a time, and twice recharged her accumulators. In June, 1901, the Narval remained under water for 12 hours. The Ministry of Marine were represented by Naval Surgeon Gibrat, who wrote a full report on the condition of the crew, who appear to have suffered from the confined conditions and from the fumes from the accumulators.

Four submersibles besides the Narval have been launched. They resemble the Narval in most particulars, though in some respects they are improvements on their prototype. These are: Triton, launched July 13, 1901; Sirène, launched May 4, 1901; Espadon, launched August 31, 1901; and Silure, launched October 29, 1901. The outer hull of these vessels is made of steel, and the inner hull of nickel steel. A special gun-metal was used for the Gustave Zédé and the Morse, which cost 15 times as much as steel. Between the two hulls are seven compartments for water ballast and four trimming tanks. For subsurface propulsion two electric motors, connected with the main shaft, are used. The Sirène has succeeded in submerging itself in five minutes, but she takes longer to come to the surface again. She cost £32,000. The Triton, which cost £24,700, recently made a run of 40 miles at 10 miles an hour in heavy weather, and remained for four hours 50 ft. below the surface.

The Espadon recently went safely from Cherbourg to Havre and back through heavy seas, sometimes on the surface, sometimes 20 ft. below the waves; her average speed was 8 knots, and her maximum 9·47 knots.

The French Budget of 1901 made provision for 23 submarine boats—20 of the "defensive," three of the "offensive" type. The New submarines.

former were all laid down last year. Nine of these—the Alose, Anguille, Bonite, Dorade, Esturgeon, Grondin, Souffleur, Thon, and Truite—are being built at Toulon ; six—the Castor, Loutre, Phoque, Otarie, Oursin, Méduse—at Rochefort; and five—the Naïade, Perle, Lynx, Ludion, and Protée—at Cherbourg. All 20 will be finished in 1904. Each will be constructed of steel; displacement, 68 tons; length, 77 ft.; beam, 7½ ft.; draught, 8 ft.; speed, 8 knots; complement, four men and one officer. Each will cost £14,616. The sole motive power will be electricity, supplied by accumulators, and they are intended for harbour and coast defence.

Of the three "offensive" submarines, Q 35 is being built at Cherbourg after the plans of M. Romazzotti. She is to cost £19,976, Q 36 has been designed by M. Maugas, and is building at Rochefort: her cost will be £31,172; while Q 37, building at Toulon after the designs of M. Bertin, the Chief Constructor to the French Navy, will cost £36,970. Details respecting these three boats have not been made public. It has been stated in some of the French service journals that Q 37 will be driven on the surface by an alcohol motor, and submerged by compressed air in place of accumulators. No submarine boats are to be laid down this year. In 1903 13 will be laid down, and by the close of the year 37 are expected to be in commission. By the year 1906 France should be in possession of a submarine flotilla numbering 68 vessels. Q 38–42 and Q 61–68 are to be built at Toulon, Q 43–50 at Rochefort, and Q 51–60 at Cherbourg. Of these 31 boats it has been stated that eight will be "submersibles" with a double motive power, *i.e.*, a vapour or gas engine and electric accumulators. They are to have a radius of action a little more extended than that of the submarine proper, and will plunge more rapidly than the Narval or Sirène, which are obliged to fill the ballast tanks between the hulls.

Sub-marines in manœuvres. Gustave Zédé.

From 1898 onward French submarines have participated in mimic battles. Exaggerated accounts have filled the French papers, and it is difficult to arrive at the truth. In the following summary care has been taken to represent, so far as possible, what actually took place. In December, 1898, the Gustave Zédé twice torpedoed the Magenta—once while at anchor, and once whilst steaming at 10 knots. M. Lockroy has described the incident in glowing language in his book, "La Défense Navale" (1900). The Gustave Zédé took part in the manœuvres of 1901, and torpedoed the Charles Martel. This event caused immense excitement in France, and all sorts of highly coloured accounts of the feat appeared. The real facts seem to be these. The Zédé left Toulon in company with the Government tug Utile, which towed her for some distance. On nearing Ajaccio,

Lieutenant Jobart dismissed the Utile and lay on the surface waiting for the enemy. Seeing two cruisers leave their anchorage, he sank until they were out of sight; coming again to the surface, he saw that the battleships were still at anchor, and, creeping nearer, he took his bearings for an attack. When the ships began to move he sank, and as the Charles Martel passed over the submarine a torpedo was fired into her. After this the Zédé crossed the bows of the Jauréguiberry so closely that the latter had to turn in her whole length to avoid colliding with the submarine, which in war would undoubtedly have been destroyed.

Whilst some accounts state that Ajaccio was an "inviolate" port, and that the enemy had no necessity to keep a sharp look-out when they knew themselves to be in absolute security, others declare that Admiral Gervais had indirectly warned the squadron of the participation of the Zédé by recommending it to act as if threatened by an attack of submarines. It seems certain that until she discharged her torpedo the Zédé's presence was absolutely unsuspected. After her "brilliant exploit" the submarine left Ajaccio under her own power at six o'clock in the evening, and arrived at Toulon at eleven o'clock the following morning, her speed averaging 8 knots.

On July 27, 1901, during a sham fight at Toulon, the Zédé was reported to have approached the Bouvet (on which were MM. Waldeck-Rousseau and De Lanessan) unseen, and to have fired a torpedo into the battleship whilst the Minister and the admiral were peacefully eating their dinner. This affair is said to have been a "put-up job."

In July, 1901, the Morse, after journeying from Cherbourg to Havre (72 miles), made an attempt to torpedo the Cocyte; some accounts say that she successfully fired three torpedoes; others that none could be discharged owing to the swell. Morse.

In December, 1902, the Narval and Morse defended Cherbourg from an attack by the Bouvines and Valmy, and succeeded in torpedoing these vessels.

During some naval manœuvres at Cherbourg in January, 1902, the guardships Bouvines and Tréhouart and the torpedo boat destroyer Cassini were attacked by the Morse, Narval, Triton, Espadon, and Français. The Bouvines was hit at 100 yards by a torpedo from the Morse, which used her periscope. The Tréhouart was attacked by the Triton and the Espadon; the former came to the surface as a fishing boat got in her way, and she was put out of action; the latter fired a torpedo which hit the Tréhouart. The Cassini evaded the Morse, but passed within range of the Français and was torpedoed by her. Thus of the five submarines one was put out of action, whilst all three warships were destroyed.

Germany.

Experiments have been carried out during the past few years with submarines in Germany, but few details are obtainable. A boat designed by an ex-lieutenant of the German Navy was built to the order of the Cyclops Company, Messrs. Schwartzkopff and Messrs. Howaldt, in the yards of the last-named firm. It has been stated that this boat has made 16·5 knots on the surface and 9·5 submerged.

Italy.

The Italian Navy is credited with possession of three submarines. One of them is the Audace; another the Delfino, designed by Engineer Pullino; of the third nothing definite is known. The Delfino has maintained a speed of 10 knots for several hours together. Colonel Cuniberti is said to have invented an oil engine which will be used as the sole motor in a new "submersible" to be built.

Russia.

It has often been stated that the Russian Government some years since ordered 300 Goubet submarines, the hulls to be built in Russia, and the engines and mechanism to come from France. Whether any of these are to-day possessed by Russia is very doubtful. Last year the construction of a submarine boat designed by Lieutenant Kolbassieff and Naval Engineer Kuteinikoff was begun at Cronstadt. She is cigar-shaped, with a piece cut away along the upper part. On the sides forward there are blades which are used in sinking or raising the boat. Six more submarines are said to be building at Cronstadt.

United States.

Mr. Whitney, when Secretary of the United States Navy, being anxious to provide some kind of protection against gun-fire for torpedo boats, invited proposals for submarine boats. A great many designs were sent in, and two propositions to build were made by Messrs. Cramp, the designs being those of Holland and Nordenfelt. The design of the former was accepted. Difficulties in regard to guarantees of performance prevented the closing of a contract that year, viz., 1888, and the next year a change in the Administration caused the matter to be put aside. After the lapse of some time,

interest in submarine boats was again aroused, and on March 3, 1893, Congress authorised the building of a single experimental vessel; and, after a third competition of design, a contract for a Holland boat was signed, two years later, with the Holland Torpedo Boat Company, formed in 1895. The new vessel was to be called the Plunger. Although she was actually launched on August 7, 1897, the Plunger has never been completed, and has now, I believe, been broken up. The motive power of the Plunger on the surface was a steam engine fed with liquid fuel, but while she was in course of construction Mr. Holland decided to build a new vessel in which the steam engine should be replaced by a gasoline engine of the Otto type.

This boat, known as the Holland, was constructed at Elizabethport, New Jersey; and some account of her has been given in the *Naval Annual* for 1901, pp. 59–60. As Mr. Holland had been experimenting with submarine craft for 25 years, and as he now considered that he had secured a practical result, and that his newest boat would do all that he claimed, he requested the United States Navy Department to make a series of trials of the Holland. On November 4, 1898, a Board was appointed for this purpose. Many trials were carried out, and finally the Holland was purchased on April 11, 1900, this being the first under-water craft acquired by the United States Government. During the manœuvres of the North Atlantic squadron in September, 1900, the Holland appears to have made a successful attack upon the fleet at night by herself without convoy, at a distance of seven miles from the mouth of the harbour. She claimed to have torpedoed the flagship of the squadron, the Kearsarge. Lieutenant Caldwell, who was in command of the Holland, said that he considered that the attack was a success, because the Holland could in all probability have torpedoed three blockading vessels without being discovered. The Holland boats.

On January 8, 1901, the Holland left Annapolis at 1.30 p.m., and reached Norfolk at the same hour on the 10th, the entire run being under her gas engines and without any assistance. Of these 48 hours she spent $25\frac{1}{2}$ under way, 10 in making repairs and recharging accumulators, and $12\frac{1}{2}$ at anchor. She covered 145 knots at an average of 5·69 knots, her maximum speed being 7 knots.

On June 7, 1900, Congress authorised the construction of six more Hollands of an enlarged and improved type. These are named Grampus, Pike, Adder, Mocassin, Porpoise, and Shark. The first two were built at the Union Ironworks, San Francisco; the other four being constructed in the yards of Lewis Nixon at Elizabethport, Programme 1900.

New Jersey. The specification for these boats resembles in almost every particular that for the five British submarines ordered in 1900 (Programme 1901–2).

The Fulton.

The Holland Company recently constructed an experimental vessel for their own use—the Fulton, launched on June 2, 1901. In the autumn of last year this vessel, with seven officers and men on board, remained for 15 hours at the bottom of Peconic Bay, whilst rough weather was raging above, without having the air in the interior renewed. At the end of the 15 hours' trial the Fulton came to the surface, and her crew are reported to have been none the worse for their experience. There seems to be no question but that the Fulton is a great improvement on the old Holland, and some of those officers who had little belief in the latter's capabilities have since acknowledged that vessels of the Fulton type might find useful spheres of action in naval warfare.

The Argonaut type.

In June last the United States Board of Construction examined the plans of a new submarine torpedo boat designed by Mr. Simon Lake, of Baltimore, the constructor of the Argonaut, a vessel which rolls along the ocean floor on wheels, and is primarily intended for salvage operations. The new boat is to be of 120 tons displacement, with a surface speed of 10 knots and a submerged speed of 7 knots. The Board recommended that a working model be constructed, but there is a dispute between Mr. Lake and the Holland Company. No other submarine boats are to be put in hand pending further trials.

Brazil.

Senhor Mello Marques, formerly of the Brazilian Navy, has invented a new type of submarine boat, which was tried last year as a model in a tank in the presence of the President of the Republic, the Minister of Marine, and others. The propelling power appears to be electricity solely. Another type of submarine boat has been designed by Senhor Jacintho Gomes, and the Minister of Marine has appointed a committee, under the presidency of Admiral Wandenkolk, to report upon the respective merits of both designs, in order that a boat may be put in hand.

Norway.

As some Norwegian naval officers were present at the trials of the Fulton last autumn, it is thought possible that Norway will shortly acquire one or more of the Holland type. Admiral Borresen is reported to have asked for £35,000 for this purpose.

SWEDEN.

Mr. Enroth, a Swedish engineer, has offered a submarine to the Swedish Government. Its dimensions are: Length, 82 ft.; beam, 13 ft.; diameter, $11\frac{1}{2}$ ft.; displacement, (light) 142 tons, (submerged) 146 tons; engines, 100 H.P., supplied by two boilers heated by oil; speed, 12 knots surface and 6 submerged. The boilers have no function when the boat is submerged, the engines being then partly driven by the steam already generated and partly by compressed air stored in tanks placed fore and aft.

PORTUGAL.

In October last trials were made with a model of a new submarine invented by Lieutenant Fontes, who designed the Plongeur, built in Portugal and tried in 1892.

SPAIN.

Since the launch of the Peral on October 23, 1887, Spain does not appear to have actively interested herself in submarine navigation. As no use was made of the Peral in the Spanish-American war, little value is apparently attached to this craft.

In a recent leader the *Engineer* said: "We may take it for granted that the submarine boat is entirely useless so long as she is blind. . . . Broadly speaking, the key of the problem consists in devising an eye for the submarine boat. Until that has been obtained these craft cannot be worth what they will cost save in so far as they have a moral effect." Vision below water.

Reference has been made in the *Naval Annual* for 1901 (page 39) to the periscope carried in the French boats. This appears to have been improved of late, if, as is reported, the Morse recently torpedoed the Bouvines, steaming solely by means of her periscope.

A new periscope, termed the "cleptoscope," has lately been invented by Signors Russo and Laurenti, engineers in the Italian Navy, for use in submarines. Its advantages are that it has a large field of view, and that the tube which is visible above the water is of small diameter. The original French periscope had only a field of view of three or four degrees, and with so small a field the unsteadiness of

the boat made it difficult to locate surrounding objects. The improved Mangin-Laussedat periscope (according to the *Italia Militare e Marina*) which was furnished to the Gustave Zédé had a larger scope, but the objects were distorted, and the tube was over 13 in. in diameter and therefore very visible above water. The tube of the cleptoscope has only a diameter of about 4 in. and a field of view of 60 degrees, which is without distortion and extends to the horizon. The Italian submarine Delfino is fitted with the cleptoscope. In reality there seem to be two instruments under the name, or two forms of the same instrument—one giving a panoramic view transmitted to a small chamber, the other displaying the same view upon a larger scale. No sufficient particulars have been published to justify an opinion as to the value of the invention.

CHAS. N. ROBINSON.

CHAPTER IX.

Marine Engineering.

What is conveniently, though somewhat incorrectly, known as the triple-expansion engine—more properly the three-stage compound engine—still holds its own in war vessels, although the working steam pressure has reached the 250 lbs. to the square inch, generally allowed to be that at which compounding to a fourth stage is considered profitable. In ships of the merchant marine a good many quadruple expansion or four-stage compound engines have been fitted, notably in the case of the cargo boat Inchmona and her sister vessels, mentioned in previous issues of the *Naval Annual*. Moreover, the modern three-stage compound engine, which is now generally balanced on the Yarrow, Schlick and Tweedy principle, has four cylinders and four cranks; and though the substitution of a second intermediate-pressure cylinder for one of the twin low-pressure cylinders would need some reconsideration of the design—in order to maintain the proper distribution of reciprocating weights required to secure balancing,—yet the departure from standard practice in other respects would be a comparatively simple question. If the design advocated by the late Mr. Mudd were accepted, the four-stage compound engine could be given two low-pressure cylinders and five cranks, upon the principle that odd numbers of cranks should always be used.* (Three and four stage compounding.)

In America the three-stage compound engine has also been largely retained, although in the recent battleships, which are fitted with water-tube boilers, the steam pressure has reached 250 lbs. to the square inch. One or two four-stage compound engines have, however, been introduced on the smaller vessels. (American practice.)

There being no radical change to chronicle in the main engines of war vessels, we must look to details of design for indications of advance. Here, again, though there is ample material, there is not much that could be appropriately recorded in this chapter. Marine engineers appear to be devoting their attention to bringing general practice up to the standard required by the higher steam pressures now considered essential to efficiency. The arrangement and construction of steam pipes, lubrication of rubbing surfaces, balancing of slide valves, and arrangement of auxiliary machinery, (Details of design.)

* *Cf. Naval Annual*, 1897.

may be taken as examples of features now requiring consideration; but such considerations are only fitted for discussion before a technical audience. Unfortunately for the yearly chronicler, the history of engineering progress is a record of details. Now and then they culminate in a change that appeals to the general public, but that is by no means an annual event.

The progress of invention. In steam boilers.

Looking back to the beginning of marine engineering, certain landmarks of progress appear to stand out sharply defined; but, examining the records closely, one finds they were erected by slow and laborious process; after many delays and much disappointment. The plain flue boiler grew into the multi-tube square box boiler; from that to the cylindrical boiler; which in turn, for naval work, has given way to the water-tube boiler. Here are three changes in about 70 years. It is now 23 years since the Admiralty purchased the first water-tube boiler for propelling purposes. It was not until after about 13 years of enquiry and experimenting with small vessels that it was determined to place water-tube boilers in important craft. Even now it is nearly seven years since the Powerful and Terrible were launched, and yet those who essay to write current engineering history have to look on the water-tube boiler as the chief "novelty" of the day.

In marine engines.

If we turn to the marine engine we find that similar conditions have generally prevailed. The first great moving cause of change was the introduction of the screw propeller. That was by no means a sudden evolution, but in the course of more than half a century it has transformed the old side-lever engine into the inverted direct-acting engine of the present day. Putting aside paddle-wheel steamers we find the successive steps in the development of the navy engine to be from simple expansion to compound two-cylinder engines; and to that was added another stage of compounding, producing the triple-expansion type; that is an advance of three steps gradually and cautiously taken. The last has covered a period of about 12 years, for it was in 1874 that Mr. Alexander Kirk fitted a triple-compound engine on board the Propontis; with good results so far as the engines were concerned.

The condenser.

After all, the one great change in the marine engine has been from jet condensing to surface condensing. That has made high pressures possible, and has thus rendered the compounding of cylinders profitable. From the simple expansion jet condensing engine to the surface condensing compound engine has been the notable and distinct change. Triple expansion, quadruple expansion, or any number of stages of expansions are only like adding another storey to a house. The modern vertical engine is no more than the once universal horizontal

engine placed on end; just as it is the old side-lever engine turned upside down. The principle is exactly the same; there is only a difference in the disposition of the working parts. Looking back, one sees trunks, return connecting rods, oscillating cylinders, spur gears, and numberless devices. From time to time they have dawned on the engineers' horizon, have become distinct, and then merged into the obsolete at overlapping periods not defined enough to fix the duration of their era. Engineering practice is ever progressing, but it is progress in detail. It is only about once in ten years or so that it culminates in what is called "a new departure."

The steam turbine.

We are now—if we are to believe some engineers, who certainly support their argument with very substantial facts—on the eve of one of these "new departures" in steam engineering practice. How long an engineering "eve" lasts may be an open question, but the Parsons steam turbine, to which reference is made, has been known to the public fifteen or sixteen years. Indeed, the rotary engine, of which it is an example, is the oldest of all steam motors, having been suggested years before the reciprocating cylinder and piston engine was thought of. Even as a marine engine Mr. Parsons' design made its appearance before the public at the time of the late Queen's Diamond Jubilee, now five years ago; when the Turbinia astonished the world by the wonderful runs she made in the Solent.

The Viper and the Cobra.

In the *Naval Annual* of 1901 reference was made to the destroyers Viper and Cobra, the trials of the former having been then recently made. Since then, by a curious fatality, both these vessels have been lost; and thus the Royal Navy—for the Cobra was also purchased by the Admiralty—has been deprived of the only vessels fitted with steam turbine machinery. The experience to be gained by the Navy with this most interesting and promising class of machinery has therefore been stopped for a time. In the First Lord of the Admiralty's annual statement it is said that the Board are negotiating for the building of two destroyers and a third-class cruiser to be propelled by steam turbines, in order to renew the experiment. It might be thought, perhaps, in view of the success of the Viper's machinery—for her loss was due entirely to a peril of navigation, and had nothing to do with the machinery—that a little more boldness might have been shown, and the merits of the turbine system could, with advantage, have been recognised in a more substantial manner. It is most desirable, in view of the possibility of naval warfare—a possibility which, even if remote, alone warrants the spending of such large sums on the Fleet—that our vessels, especially the lighter craft, should have the highest speed compatible with the possession of other necessary qualities. There can be no

Speed of light vessels.

question as to the speed which the steam turbine affords; experiment has put that beyond doubt. In one other important respect, the freedom from breakdown, the steam turbine would seem to afford additional promise of safety. Although the period of turning is extremely high, the absence of reciprocating parts—of cranks, pistons, cross-heads, &c., with their alternating stresses—reduces the anxiety in regard to accident in a most satisfactory manner. In yet another most desirable feature the steam turbine appears to advantage, for there is no need to apply internal lubrication; and though torpedo craft are often run without oil in the cylinders, in order to save the boilers, yet the practice is not desirable in the interests of the engines alone. Moreover, the piston rods of the ordinary engine need oiling, and, in spite of all precautions, an amount of the lubricant, sufficient to be objectionable, is apt to get into the cylinders in this way.

Freedom from break-down.

After the way the Admiralty engineers have been attacked for the adoption of the water-tube boiler, one cannot, however, wonder that enterprise is somewhat checked; and we may be thankful that a step in advance will be made by putting steam turbines into a craft of the size of a third-class cruiser. The elements of design of this vessel are not given in the First Lord's statement, but two protected third-class cruisers, named Amethyst and Topaze, are down in the Estimates for 1902–1903. They are to be built by contract, but have not yet been ordered,* and although they are stated to have been designed by Sir William White, the details of hull are "not yet complete," and the design of machinery has not yet been settled. Not many third-class cruisers have been added to the Navy of late, the last ship of the type being the Pandora, completed within the last twelve months. The class is following the apparently inevitable law of growth of dimensions. The Pandora is 305 ft. long, 36·9 ft. wide, and 2200 tons displacement, her maximum designed speed, with 7000 H.P., being 20 knots. The oldest third-class cruiser on the list is the composite-built Royalist, launched in 1883—200 ft. long, 38 ft. wide, and 12·6 knots speed. The Amethyst and Topaze are to be 360 ft. long, 40 ft. wide, 14 ft. 6 in. mean draught, and 3000 tons displacement. With a maximum of 9800 I.H.P. the speed is to be $21\frac{3}{4}$ knots. It will be seen that a third-class cruiser is a very different craft now to what it was twenty years ago.

Proposed new steam turbine vessels.

Third-class cruisers.

These details are of interest here as bearing on the possibilities for distinction of the steam turbine machinery. Of course, there will be no objection to the legendary horse-power and speed being exceeded, but with a ratio of length to breadth of nine to one, and 3000 tons displacement, the new system of propulsion will not have the same

* Reported to have been ordered from Messrs. Beardmore.—Ed.

chance of producing a sensational result as would be possible with a destroyer or a torpedo boat. Probably the experiment will be not less welcome on this account, as Mr. Parsons is understood to be anxious to prove that his system of propulsion possesses advantages for staunch ocean-going ships, and not only, as is so often supposed, for the mosquito fleet. The new third-class cruiser will be a fast vessel, having, presumably, nearly three and a third horse-power for each ton of displacement, even as designed; but she will not be such a craft as Mr. Parsons suggested some time ago, when he proposed a steamer that would make the $19\frac{1}{2}$ knots from Dover to Calais in under half an hour, or the 65 knots from Newhaven to Dieppe in one hour and 40 minutes. This latter vessel was to be of 1300 tons displacement and 50,000 H.P., with express type of water-tube boilers. Of course such a craft would be very different to a warship, carrying neither armament, stores, or supply of fuel. The new third-class cruisers in the Estimates are to have a coal capacity of 300 tons.

Efficiency of the steam turbine.

In regard to the important question of the efficiency of the steam turbine, it has been shown by exhaustive and well authenticated experiments made with electric generating machinery—which, it may be stated, affords a most excellent means of arriving at results—that the steam consumption was 9·19 kilogrammes per kilowatt-hour, or about $12\frac{1}{2}$ lbs. per I.H.P. per hour. How nearly this result would be reached on board ship it would be rash to predict without making a closer comparison of the different conditions than the data at our disposal will admit. The figure may, however, be compared "without prejudice" to the $15\frac{1}{3}$ lbs. of water per hour used in the main engines, which was the best result quoted by Sir John Durston in his paper on H.M.S. Argonaut; or the 13·4 lbs. obtained on the trials of the steamer Iona, which was experimented upon by the Research Committee on Marine Engines of the Institution of Mechanical Engineers; or even the 11·7 lbs. recorded of the Milwaukee triple-expansion pumping engines, experimented upon by Professor Thurston, on a trial which Captain Sankey has pronounced to be one of the best on record; although, it is interesting to add, "even this engine was only able to do 79 per cent. of the possibilities."

Steam turbines in passenger steamers.

In spite of the unfortunate wrecking of the Viper and of the sad loss of the Cobra, the steam turbine appears to have made fairly satisfactory progress during the past twelve months. The Clyde passenger steamer King Edward, built at Dumbarton by the Dennys and engined by the Parsons Marine Steam Turbine Company, has had a most successful season, running between Campbeltown and Fairlie with regularity and at a speed which exceeded that of other well-known vessels of the Clyde Estuary. Some interesting details

of the season's running compared with the performance of another passenger steamer, the Duchess of Hamilton, have been published in *Engineering*, and, as the coal consumption of turbine machinery has been a good deal discussed, they may be repeated with advantage. Records of practical work extending over a considerable period are always valuable, but generally difficult to get. The Duchess of Hamilton is a modern paddle-wheel steamer, owned by the same company, and built by the same firm, as the King Edward, and she has been always considered one of the best boats on the Clyde. The following are the details:—

	King Edward.	Duchess of Hamilton.
Total coal	1429 tons 16 cwt.	1758 tons 13 cwt.
Miles run	12,116	15,604
Miles per ton	8·47	8·87
Number of days running ...	79	111
Daily average coal	18 tons 2 cwt.	15 tons 17 cwt.
Average speed	About 18½ knots.	About 16½ knots.

As stated in *Engineering*, one would expect the coal burnt per mile to be much greater with the faster ship. It would be interesting to have the coal per I.H.P., but as turbine engines cannot be indicated, we have to accept the inconclusive standard of coal per mile. Whatever discrepancy there may be is, in this case, against the King Edward, as the power needed increases in a very high ratio as speed advances, especially at high speeds, so that the record is distinctly in favour of the turbine ship. Another steamer similar to the King Edward is to be built for next summer. She will be 20 ft. longer than the existing boat, and her speed is to be 21 knots.

Steam turbines in yachts.

The Parsons Marine Steam Turbine Company have also under construction at the present time the machinery for three important yachts. The largest of these is being built at Leith for an American owner. She will be 260 ft. long over all, or 253 ft. on the water-line. Her breadth, moulded, will be 33 ft. 3 in., and her tonnage, yacht measurement, 1400 tons. The machinery will develop about 3500 H.P. A second vessel being built on the Clyde will measure about 700 tons and have engines of 1500 H.P. Perhaps the most interesting of the three yachts will be one that has been designed for Colonel McCalmont, and is being built by Yarrow & Co., at Poplar; the boilers, which are to be of the Yarrow type, will also be made by the same firm. This

vessel will be 152 ft. 6 in. long and 15 ft. 3 in. in breadth. What power the engines will develop is not yet decided, but as the speed is to be at least 24 knots, it will have to be considerable. These three vessels are to be ready this spring, and probably Colonel McCalmont's new boat will be the sensational yacht at the Coronation Naval Review.

The Velox.

In view, no doubt, of the wrecking and total loss of both the Viper and the Cobra, it was determined by the Parsons Company not to wait until the Estimates were passed and orders given out by the Admiralty, but to proceed at once with a new torpedo boat destroyer in which was to be incorporated certain improvements which have been suggested as the result of experience. This boat, named the Velox, has been constructed by R. and W. Hawthorn, Leslie & Co., the same builders who constructed the Viper; and was launched from their yard at Hebburn-on-Tyne on February 11. She is of the same general dimensions as the latter craft, being 210 ft. long, 21 ft. wide, and 12 ft. 6 in. moulded depth.

Combination of steam turbine and reciprocating engines.

The propelling machinery is entirely novel in its general design. It consists, firstly, of two independent sets of compound steam turbine engines, each having one high-pressure stage and one low-pressure stage. The port and starboard sets are of equal power, and are placed side by side. Each turbine drives a separate line of shafting, and each shaft has two propellers. There are therefore four shafts and eight propellers in all. The high-pressure turbines drive the outer shafts, and the low-pressure turbines the inner shafts. For going astern, reversing turbines are incorporated in the exhaust casing of each of the low-pressure turbines. So far the machinery is on the same general lines as that adopted for previous vessels, but a new combination has been made by the addition of two small auxiliary propelling engines of the ordinary triple-expansion type. These engines are directly coupled to the main turbines and work in conjunction with them. Steam is taken by them directly from the boilers, and is exhausted into the high-pressure turbines, from whence it passes to the low-pressure turbines, and then to the condensers. This will be the practice followed at cruising speeds, the object being to secure economy. Steam turbine engines, being in this respect similar to other steam engines, are most efficient when working within a given range of power of somewhat narrow dimensions. For fighting ships, which must be capable of very great speed not often required, the economy of steam must be reached at fairly high powers, and that is why war vessels so often compare unfavourably with merchant ships in the matter of coal consumption. With the steam turbine the speed of rotation is necessarily high to secure economy,

but by passing the steam first through the reciprocating engines—which are especially designed for the comparatively low powers of cruising speed—the steam can be used at the fullest advantage compatible with practical considerations. When high speed is required the auxiliary reciprocating engines are thrown out of gear, and the turbines drive the vessel.

Economy at high and low speeds.

The arrangement embodies an ingenious attempt to solve a problem that has long vexed the designers of warship machinery. It may be objected that two extra sets of engines have to be carried; but these, it must be remembered, need be but small and light, for they will only be used for the extremely moderate powers needed for low speeds. The way in which power increases as speed rises need not be insisted upon. It is the last three or four knots that "takes all the getting." The lightness and compactness of the steam turbine machinery, moreover, gives opportunity for some additions.

Weight and space occupied.

In connection with this feature, the following comparison, taken from a paper read by Mr. McKechnie before the Institution of Mechanical Engineers, may be of interest. It shows the difference between weight and space occupied by turbine machinery and reciprocating engines respectively, when either are developing 7000 I.H.P.:—

—	Reciprocating engines.	Turbine machinery.
Weight in engine rooms and tunnel complete ...	270 tons	190 tons
Floor space in engine room	911 square ft.	911 square ft
Cubic capacity required by engines	14,430 cubic ft.	10,500 cubic ft.

The performance of the Velox will be looked forward to with great interest. It is anticipated that the maximum speed will equal or be little inferior to that of the Viper (although the boilers have about 13 per cent. less heating surface), but if the vessel should fall short in speed, even to an appreciable extent, the coal economy at lower rates of steaming will be more than compensation; for the claim that the Velox, at cruising speed, will have a fuel economy superior to that of any vessel of her class appears to be well grounded. Other measures for securing economy have been introduced, including feed, heating arrangements, &c. The boilers are of the Yarrow type, and have 13,000 square feet of heating surface, which is about the same as that allotted to a 30-knot destroyer.

In the *Naval Annual* of last year the interim report of the Admiralty Water-Tube Boiler Committee was briefly noticed; and the conclusions which had been arrived at by all the members of the committee, excepting Mr. J. A. Smith, R.N., who represented the naval element on the committee, were quoted. It will be remembered that it was recommended that Belleville boilers should not be fitted to H.M. vessels in any case, but in ships completed the boilers of this type were to be retained. The Water-tube Boiler Committee.

A fuller report of the trials of the two Navy vessels that were under test by the committee, H.M.S. Hyacinth and Minerva, as well as the details of a trial of a third, the Cunard steamer Saxonia, has been recently issued. The report is the result of an immense deal of labour, carefully conducted and directed by scientific knowledge on the part of members of the committee. Unlike the interim report, there are, however, no expressions of opinion attached to this second issue. It is very easy for superficial thinkers and hasty writers to form wrong conclusions on this subject, a fact already proved by remarks made by public speakers and by opinions expressed in the daily Press. It will probably be found, on careful comparison of the details contained in the report with other data, that they will show other water-tube boilers possess many elements of superiority over the Belleville type, as well as over the older types of steam generator. On which side advantages will outweigh disadvantages is a matter upon which it would be premature to pass an opinion at the present time. No doubt in any type of water-tube boiler, as at present designed, there is room for improvement; but there is no feature of marine engineering practice of which the same thing could not be said.

The data collected are fully set forth in the report by a number of tables contained in an appendix, and these are conveniently summarised in two tables, Nos. 25 and 26. The former gives the chief particulars relating to boiler performances, whilst the latter deals with the engine trials. Three chief pairs of trials were carried out; besides which long sea runs to the Mediterranean and back were made by the two vessels. The first of these three trials was at about 2000 H.P., the second at about 5000 H.P., and the third at about 8000 H.P. They were all carried out in the English Channel. The weather was moderate throughout. Welsh coal was used, hand-picked. Analyses of the coal are given, but the difference in any case was not very great. The flue gases were also analysed and their temperature taken, whilst other data were collected. The thermal efficiency of the boilers was worked out by the committee, and forms a useful figure of merit by which the performances of the different Trials of H.M.S. Hyacinth and Minerva.

Boiler efficiency.

steam generators may be compared. In the 2000 H.P. trial, which extended over a period of about 25 hours, the actual evaporation per pound of coal as fired was 8·56 for the Minerva and 9·65 for the Hyacinth. The equivalent evaporation from and at 212 degrees Fahr., which is, of course, the truer test, was, respectively for the two ships, 10·26 and 11·46 pounds of water per pound of coal. The thermal efficiency was 69·7 for the tank boilers of the Minerva and 77·2 for the Belleville boilers of the Hyacinth. So far as evaporative efficiency is concerned the Belleville has here a very decided advantage over the tank boiler. Passing to the higher power trials of 5000 H.P., we find the Hyacinth's boilers still give the best result, although the difference is not so marked, the thermal efficiency of the Minerva's return-tube boilers being 68 per cent. and of the Hyacinth's water-tube boilers 71·8 per cent. At 8000 H.P. the Hyacinth's boilers have a still greater advantage, the evaporative efficiencies of the boilers being respectively 61·4 and 73·3.

The value of retarders.

After these three trials had been run, it was decided to try the effect of retarders placed in the tubes of the Minerva's boilers. These improved the performances very greatly, bringing up the efficiency to 68·4 in the four tank boilers, which were alone used on this trial. This gave a gain in boiler efficiency of no less than seven per cent. due to retarders. It will be seen, however, that the efficiency of the Minerva did not reach that of the maximum shown by the Hyacinth, which was 73·3. It is, however, difficult to make an exact comparison because of the dissimilarity between the conditions of the trials. The Hyacinth's boilers reached their maximum efficiency when running at 8000 H.P., whilst the Minerva's boilers did their best on the 2000 H.P. trial. Whether the use of the retarders at this latter power would have increased the efficiency of the tank boilers to an equality with that of the Belleville boilers at their best is a matter upon which a conclusion cannot be expressed in the absence of strictly comparable experiments. As matters remain the Hyacinth shows a better performance than the Minerva, even with retarders in the boiler tubes of the latter.

The Saxonia's trial.

The Cunard steamer Saxonia, however, displays a boiler efficiency far superior to that of either of the Navy vessels. The actual evaporation of her boilers per pound of coal was 11·30 pounds of water, with the engines developing about 9000 H.P. The equivalent from and at 212 degrees Fahr. is 12·33 pounds of water evaporated per pound of coal. This is certainly a very satisfactory result, and brings the thermal efficiency of the boilers to 82·3 per cent. There is something to be set off against this saving in coal. The Saxonia's engines developed 9099 I.H.P. The Minerva's engines gave 9542

I.H.P., whilst those of the Hyacinth reached 10,180 H.P. If we take the weight of machinery we find the magnitude of the figures reversed. The Hyacinth, which developed most power, has the lightest machinery, whilst the Saxonia, which developed the least, has the heaviest; the Minerva being between the two. In the weight of main engines are included propellers, spare parts, evaporating and distilling apparatus. On the Hyacinth these weighed 378·4 tons, and on the Minerva 364·8 tons, so that in propelling engines alone the virtue of lightness can be claimed by the Minerva. The boilers, with funnels, spare parts, and hot water to working height, pipes, fans, feed-engines, and all boiler-room weights, amounted in the Hyacinth to 453·8 tons, and in the Minerva 557·4 tons. It is somewhat difficult to make an exact comparison on the same lines with the Saxonia's machinery, but the following figures are also given: Main engines, 789 tons; main boilers, including water, Howden's fittings, uptakes and funnel, 910 tons; auxiliary machinery, 60·3 tons; fittings, spare gear, &c., 226 tons. The totals are: For Hyacinth, 832·2 tons; for Minerva, 922·2 tons; for Saxonia, 1985·3. Reducing these figures to the equivalent of the power indicated, we get the following: For every ton of total machinery in the Hyacinth there was developed 12·33 I.H.P.; in the Minerva, 10·34; and in the Saxonia, 4·58. It will be seen, therefore, that the economy in fuel of the merchant vessel's machinery has to be paid for by a great addition to the weight of machinery—a fact which any engineer would predict. There is naturally a point at which it becomes economical, in regard to total weight carried on a voyage, to add to the machinery in order to reduce the bunker coal. Still, even for commercial reasons alone, it by no means follows that coal-saving devices will make a ship cheaper to run. Some of these appliances are not worth fitting, for the interest on the capital cost may easily be in excess of money saved through purchasing smaller quantities of fuel than would otherwise be needed. These remarks, however, are of a general nature, and do not apply to the instance under consideration. The Saxonia was fitted with Howden's system of forced draught, and had nine single-ended cylindrical boilers. Her trial occupied only 13 hours, being made between Liverpool and Queenstown.

Weights of Navy and mercantile machinery.

So far as we have gone, the Hyacinth's Belleville boilers possessed a decided advantage for naval purposes; but, unfortunately, in the course of work they developed defects of a serious nature. The programme of the ocean-going trials for the Minerva and the Hyacinth was for the ships in the first instance to run from Plymouth to the Mediterranean, the engines in each ship maintaining about

Defects of Belleville boilers.

7000 H.P. They were to continue working at this power until all the coal was burnt, excepting some in a reserve bunker. This outward run was intended to be a power-endurance trial, which would give indication of the radius of action for each ship. The homeward run was also to be an endurance trial, but simply in reference to power. The Hyacinth carried 968 tons of coal, and the Minerva 1016 tons. The total reserve tank storage of water was about 140 tons in the Hyacinth, and about 170 tons in the Minerva. These large quantities of reserve water were taken so that, if possible, the evaporators should not be worked during the run out, in order that the loss of feed water might be accurately determined. The Hyacinth started with 17 of her 18 boilers in use, and power was maintained steadily until fog was encountered on passing through the Straits of Gibraltar, about 60 hours after starting. Power had to be reduced for about two and a half hours, after which it was again raised to 7000 H.P., and maintained for 40 hours more. This brought the trial up to the 10th of July, it being 103½ hours after leaving Plymouth. The reserve water had been rapidly reduced, and had fallen to 35 tons, when the chief engineer asked to be allowed to start the evaporators on account of the level having fallen so low that it was difficult to pump from the tanks.

Leaks in the Hyacinth's boilers.

During the latter part of the trial a number of small leaks had developed in the boilers, and the loss of water increased rapidly. This was especially the case after reducing speed off Gibraltar on account of fog. It was thought possible that the sudden easing of the engines caused the steam pressure to rise sufficiently to lift the safety valves. On July 11th the engines had to be eased owing to the large loss of water, and this naturally, under the conditions laid down, brought the trial to a conclusion.

Loss of water.

The Hyacinth returned to Gibraltar at slow speed. The total coal burnt was at the rate of 2·08 lbs. per H.P. per hour—under the circumstances, not at all a bad result, though 15 per cent. greater than the consumption on the Channel trials. The difference was to be expected owing to the loss of water. At the time the trial was abandoned, all the evaporators, which together would give 96 tons of water per 24 hours, were at work, and in addition to this 130 tons of water were taken from the reserve tanks, as well as 25 tons of drinking water. A total amount, therefore, of 270 tons of feed water had been lost since the beginning of the trial, or an average of 8·9 tons per thousand H.P. for 24 hours. During the 7th of July, the day after the trials commenced, and again on the 8th of July, the feed water was measured for a period of four hours,

and it was found that the mean steam per H.P. was 17·21 lbs. This included the steam used by the auxiliary engines, which exhausted into the low-pressure receivers. The result did not differ greatly from that obtained on the 5000 H.P. Channel trial, although somewhat in excess of the latter.

This loss of water is a serious blow to the reputation of the Belleville boiler. It was, as the report states, anticipated that the radius of action of the ship at 7000 H.P. would be limited solely by the coal expenditure. It turned out, however, that the excessive loss of water was the true limiting condition. The distance steamed, when the trial had to be stopped on this account, was 1810 miles, which may be said to represent the actual radius of action of the Hyacinth at 7000 H.P.

The Minerva, on her part, continued steaming at 7000 H.P. until the total coal in the bunkers was reduced to 39 tons, when the trial was considered at an end, on the 12th of July, 152 hours after leaving Plymouth. The distance covered, which represented the actual radius of action of the ship at 7000 H.P., was 2640 miles. The mean H.P. during the run was 6911, and the coal burnt 977 tons, or 2·10 lbs. per horse-power hour. The Minerva arrived at Gibraltar with 32 tons of water left in the reserve tanks, having made 12·75 tons by her evaporators on the voyage out. The total feed-water lost was 145 tons, or 3·33 tons per thousand H.P. per 24 hours. The feed-water used by the engines was 16·05 pounds per horse-power hour for the main engines, and 1·69 for the auxiliaries. The engines ran without steam in the jackets, but it was thought, the report states, that the steam used by the engines would have been less had the jackets been in use. The Minerva's run to Gibraltar.

Towards the end of the run the air pressure for blast had to be increased from a quarter of an inch on the water-gauge to 1½ inches. This was due to the choking of the ferrules of the tubes by "bird's-nesting," and for this reason during the last seven hours the power could not be fully maintained. The openings of the ferrules in the ends of the tubes were found, on examination at Gibraltar, to be choked across half or three-quarters of their area by a "thick, hard, brown slag, which also coated the surface of the tube plates, and was not removed until access was gained, after cooling, to the combustion chambers. The retarders in the tubes were found to be in good condition at the end of the run, being only slightly burned for 1½ inches of their length." "Bird's-nesting."

The run home of the two cruisers from Gibraltar was commenced on the 17th of July. The times taken in getting up steam are of interest, so we will give the details. Taking the Hyacinth first, at Time occupied in getting up steam.

5.45 a.m. the main stop-valves in the engine-room were just warm to the hand. Two boilers were under steam. The other 16 boilers had the grates cleaned. At 12.50 p.m. the stop-valves were cooler than in the early morning. The two boilers under steam shewed 200 lbs. pressure. The other 16 boilers had grates wooded and coaled. At 3.5 p.m. the steam gauge on the engine side of the reducing valve shewed 25 lbs. pressure. The blowing engines were working on both the boilers under steam, the other 16 boilers in the same condition as before. At 3.17 p.m. the steam gauge on the engine side of the reducing valve on the port side shewed 76 lbs. pressure, while the corresponding gauge on the starboard side shewed 95 lbs. All cylinders were warmed up by the jackets. At 3.45 p.m. the two after stokeholds were closed down. At 4.15 p.m. the steam pressure in the two boilers in use was 240 lbs. In the Minerva, during the same period, the conditions were as follows:—At 7.45 a.m. there was 20 lbs. pressure in No. 1 boiler, and 15 lbs. pressure in another. The fires of both these boilers had been drawn over-night. The grates were then being wooded and coaled. Five other boilers were still warm to the touch, while the remaining boiler, which had been allowed to be under steam, had 40 lbs. pressure. At 1.30 p.m. no steam was shewing on the pressure gauges at the engines, but the main stop-valves on the engines were so hot that the hand could not be borne on them. The boiler under steam had now 80 lbs. pressure in it. The two boilers that had low pressure at 7.45 a.m. shewed no pressure, but were still quite hot. At 4.0 p.m. the temperatures of the water were taken in the boilers of both ships. There was found to be an average temperature of 94¼ degrees of the water in the Hyacinth's boilers, counting the two boilers at work. The average temperature of the Minerva's boilers was 122 degrees, or 28¼ degrees higher than that of the Hyacinth. The Minerva had one boiler at work.

This was 27 minutes before the signal for starting the latter, which was actually given at 4.27 p.m. The 16 boilers of the Hyacinth were immediately lighted and the engines started slowly ahead three minutes later. At 5.20 p.m., or fifty-three minutes from the signal, the ship was moving with nearly 7000 H.P. In the Minerva the seven standing boilers were lighted at the same time, and the engines were approximating to full power at 5.16 p.m., or 49 minutes from the signal. It will be seen, therefore, that the Minerva did rather better than the Hyacinth. The difference was so small as to be inappreciable. It will come as a matter of surprise to engineers that a return-tube boiler should beat a water-tube boiler in rapidity of raising steam. Undoubtedly the

result would have been different had the signal been given when all boilers in both ships were cold. Whether such a condition is likely to arise in time of warfare is a matter on which naval engineers will form their own opinion.

The run home from Gibraltar.

Without going into details of the run home, it will be sufficient to state that the Hyacinth, which had been overhauled before starting again, experienced great trouble from loss of water during the whole period. Forty tons of reserved water were finished by 5.15 p.m. on the 20th of July, although the evaporators had been working practically all the time. In addition to this, at the end of the run 58 tons had been used from the special reserved tanks. The report, commenting on this, says:—"It would therefore appear that as these tanks were specially fitted for this voyage, and formed no part of the ordinary equipment of the ship, the Hyacinth could not, under normal conditions, have completed the full-power run home at all unless she had used salt water make-up. Her evaporators were pushed to their full output throughout. The total feed-water lost was 329 tons, or 16·7 tons per 1000 H.P. for 24 hours."

A burst Belleville tube.

We now come to a still more serious incident in the working of the Belleville boilers of the Hyacinth. When within four hours of Spithead a tube burst in one of the boilers. A stoker was slightly injured by steam and hot coal whilst closing a fire door. The fires in this boiler were then drawn. On examination later on at Portsmouth it was found that the tube had clearly been red-hot. The rent was about eight inches long and three inches wide at the centre. There was every indication that the steel was of excellent quality. The lower tubes of the element up to the normal water-level were coated internally by a thin lime deposit. The upper tubes had not this deposit; but they were bulged in places, so as to be reduced in thickness by stretching and wasting away. The two fusible plugs in this element were gone, and the lower plugs were also absent in the two wing elements in the opposite side of the boiler, as well as the lower plug out of the element next to the one with the burst tube. The hole in the nipple of the burst tube was found to be clear and the amount of loose scale in the feed collector was small. As far as could be seen, the other elements of the boiler were uninjured. The committee attach great importance to the fact that several tubes could become red-hot without indication being given of shortness of water by the gauge-glass. "This untrustworthiness," they say, "is a most serious defect." It should be stated that a loose hand-hole door was found in the lower junction-box of this boiler in such a position as to act as a non-return valve; but the element where this obstruction existed shewed no damage. From this the committee

concluded "that the ordinary variations of firing in the Belleville boiler may cause much more serious changes in circulation than even an obstruction so obvious that, had it occurred in the burst element, it would certainly have been put down as the cause of the accident."

The committee's conclusion

After the arrival of the ships at Portsmouth, slight leaks were found in the boilers of the Hyacinth, at the joints of 142 junction-box doors, and in about a dozen other places. None of these leaks, says the report, can be described as more than slight, and the committee were driven to the conclusion that the excessive losses were due to the multiplicity of small leakages. They think that the occurrence of these leaks is inherent to the structure of the boiler used. On the other hand, the examination of the Minerva's boilers showed no leaky tubes whatever, and only six other leaks, all very slight. The cap ferrules in all boilers of the Minerva were found partially closed with bird's-nesting, similar to that discovered at Gibraltar, but not so excessive. This necessitated air pressure being increased, as on the previous occasion.

Future trials.

It is stated that the trials of the Minerva and the Hyacinth are to be repeated, as the naval engineers are not satisfied that they are conclusive. One can sympathise with the authorities in this view. Engineering practice and engineering science are by no means perfect; and it is not because an engine or apparatus has failed once, or even a dozen times, that it is proved it will be incapable for ever. If such views as this had governed engineering policy in the past we should have no compound engine, no surface condenser, no multi-tubular boiler, and, of course, no steam in the Royal Navy. Such a spirit, indeed, would have been fatal to the establishment of modern engineering science and industry. We have, however, much encouragement, amidst much that is discouraging, in regard to the use of even the Belleville boiler. The Powerful and Terrible were the two first new ships fitted, and the writer is able to state, from direct authority, supported by personal inspection, that in both these vessels the boilers have given satisfaction, in spite of mishaps that have occurred. In regard to the Powerful the testimony is quite recent; in the case of the Terrible it refers to a period anterior to her present commission; but it is pertinent to say that if the Belleville boilers in these ships can be made to work satisfactorily, similar boilers in other ships should be equally successful.

Other water-tube boilers.

In the face of what other navies have done it is futile to talk about going back to the old shell boiler. No doubt the Belleville type of water-tube boiler will not continue to hold the field. The Babcock & Wilcox boiler is already being largely adopted. The

Yarrow modified small-tube boiler is to be tried on an extensive scale; and the Niclausse boiler is also to be fitted. Which of these will survive, or whether an entirely new type will arise, it would be foolish to predict. Doubtless for different purposes different designs will be found suitable. Probably by the time the next issue of the *Naval Annual* appears, the Navy boiler question will have made one more step towards solution; but, as already pointed out, engineering development is not a sudden process, and yet another year will certainly not bring finality.

In the meantime we can only hope to be in the van of progress; we must never allow the Navy to lag in the rear.

G. R. DUNELL.

PART II.

BRITISH AND FOREIGN

ARMOURED AND UNARMOURED SHIPS.

PART II.

ALPHABETICAL LIST OF BRITISH AND FOREIGN ARMOURED AND UNARMOURED SHIPS.

The arrangement of the lists of ships has not been changed since the important modifications made in the edition of 1896. The order of the columns corresponds in the British and Foreign Lists, except that in the former there are spaces for the makers of engines and the bulkhead protection, while the date of completion is given in the case of armoured ships instead of that of the launch. The calibre of all foreign guns is given in inches.

The maximum draught at normal displacement has been given wherever it was possible to ascertain it.

As every nation is constantly rearranging the armament of individual ships, it is only possible to publish the latest accessible information.

The vessels which in the British Official *Navy Lists* are called First-Class Gunboats, and in the French Lists are known as Avisos-Torpilleurs, are called in these lists Torpedo Gunboats. Torpedo-boats of all classes below Torpedo Gunboats are placed in a separate list.

Storeships, Harbour Service Ships, and Training Ships are not included in these lists.

The ships of those Powers whose Navies are of small importance will be found at the end of Part II.

The following abbreviations are used throughout the Alphabetical List, occurring mainly in the first column, showing the class of ship, and in the armour column:—

a.c.	Armoured cruiser.
a.g.b.	Armoured gunboat.
b.	Barbette ship.
br.	Broadside ship.
c.b.	Central-battery ship.
c.d.s.	Coast-defence ship.
C.	Composite-built hull.
comp. (in armour column).	Compound or steel-faced armour.
c.t.	Conning-tower.
corv.	Corvette.
cr.	Cruiser.
d.v.	Despatch vessel.
g.b.	Gunboat.
g.v.	Gun-vessel.
H.S.	Harveyised or similar hard-faced steel.
K.S.	Krupp steel.
I.	Iron hull.
shd.	Sheathed.
s.	Steel hull.
2 s.	Twin screw.
t.	Turret-ship.
t.	Trial-speed and I.H.P. at trials (in speed and I.H.P. columns).
to.cr.	Torpedo-cruiser.
to.g.b.	Torpedo-gunboat.
to.r.	Torpedo-ram.
w.	Wooden hull.

ARMAMENT ABBREVIATIONS.—As breech-loading rifled guns are now the most numerous in all fleets, it must be understood that all guns are of that description, unless it be otherwise indicated.

l.	Light guns under 15 cwt., including boats' guns.
M.L.R.	Muzzle-loading rifled guns.
M.	Machine guns.
Q.F.	Quick or rapid firing guns; unless otherwise indicated, all guns following that first marked as Q.F. in the armament column are also quick-firers.
f. tu. or b. tu.	Fixed or bow tube for discharging Fish Torpedoes.
sub.	Submerged tube for do.
B.L.	To 6-in. guns indicates that separate cartridges are used. Though this service classification is given to the latest pattern 6-in. (Vickers) gun, which has no metal cartridge, that gun attains the full Q.F. rate of fire.
A.	Armstrong guns.
K.	Krupp guns.

BOILERS.—It has been thought desirable to indicate particulars of the water-tube boilers adopted in the principal fleets. The following abbreviations have, therefore, been given in the column devoted to indicated horse-power. Where no reference occurs the boilers are of the cylindrical type; but the letter "C" implies that cylindrical boilers are used in conjunction with the type of water-tube boilers indicated:—

W.T.	Water-tube boilers, where the type is not known or not yet decided.
B.	Belleville.
Bl.	Blechynden.
B. & W.	Babcock and Wilcox.
D'A.	D'Allest.
D.	Dürr.
E.	Earle.
Ex.	Express.
Du T.	Du Temple.
L.	Laird.
M.	Mumford.
Nic.	Niclausse.
Nor.	Normand.
N.S.	Normand-Sigaudy.
R.	Reed.
T.	Thornycroft.
T.S.	Thornycroft-Schulz.
Y^1.	Yarrow small tube.
Y^2.	„ large tube.

In the column giving "Normal Coal Supply," where two figures occur, that below the line indicates the maximum.

GREAT BRITAIN.—Armoured Ships.

Class	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Completion.	Cost.‡	Armour. Side.	Armour. Bulk-head.	Armour. Gun Position	Armour. Back-ing. Deck Plating.	Armament. Guns.**	Armament. Torpedo Tubes.	Speed.	Coals that can be carried in Bunkers.*	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					£	in.	in.	in.	in.			knots.	tons.	
a.c.	Aboukir	S. shd.	12,000	440 0	69 6	26 3	2	21,000 B	Fairfield	Fairfield	Bldg.	744,783	6 K.S.	5 K.S.	6 K.S.	3–2	2 9·2-in., 12 6-in., 17 smaller Q.F.	2	21·0	800 1600	755
t. 3rd c	Ajax	I.	8660	280 0	66 0	24 0	2	4500	Pembroke	Penn	1883	518,357	18–15	16	16	18–9 3	4 12·5-in. M.L.R., 2 6-in. Q.F., 6 6-pr., 8 3-pr., 5 M., 2 l.	2	12·1	960	410
b. 1st cl.	Albemarle	S.	14,000	405 0	75 6	26 6	2	18,000 B.	Chatham	Thames Iron Works	Bldg.	1,007,489	7 K.S.	14 K.S.	11–6 K.S.	4–6 2 1	4 12-in., 12 6-in. Q.F., 12 12-pr., 6 3-pr., 2 M., 2 l.	4	19·0	900 2000	750
b. 1st cl	Albion	S.	12,950	390 0	74 0	26 0	2	13,500 B	Blackwall	Maudslay	Bldg.	802,910	6 H.S.	6 H.S.	12–5 H.S.	.. 3–2	4 12-in., 12 6-in Q.F. 18 smaller Q.F. 2 l.	5 (4 sub.)	18·25	800 1[illegible]50	700
c.b. 3rd c.	Alexandra	I.	9490	325 0	63 8	26 6	2	7000	Chatham	Humphrys	1877	514,324	12	8–5	8	12–10 1½–1	8 10-in. M.L.R., 4 9·2-in., 6 4·7-in. Q.F., 4 6-pr. Q.F., 6 3-pr., 13 M., 3 l.	4	14·3	680	600
b. 2nd c.	Anson	S.	10,600	330 0	68 6	27 3	2	11,500	Pembroke	Humphrys	1889	724,765	18 comp.	16 comp.	14–12 comp.	10–15 3–2½	4 13·5-in., 6 6-in. Q.F., 12 6-pr., 10 3-pr., 7 M., 2 l.	5	16·9	900 1200	515
a.c. a.c.	Antrim Argyll	S.	10,200	450 0	67 0	24 6	2	22,000	..	..	..	..	4 2 K.S.	5 K.S.	5–4 N.S.	.. 2–¾	2 7·5-in., 10 6-in., 10 12-pr., 3 3-pr. Q.F.	2	23·0	800	500
a.c.	Aurora	S.	5600	300 0	56 0	24 6	2	8500	Pembroke	Thomson	1889	284,550	10 comp.	16 comp.	4½	6 3–2	2 9·2-in., 10 6-in. Q.F.C., 6 6-pr., 10 3 pr., 6 M., 3 l.	2 4	18·0	900	484
a.c	Australia	S.	5600	300 0	56 0	24 6	2	8500	Glasgow	Napier	1888	259,390									
a.c.	Bacchante	S. shd	12,000	440 0	69 6	26 3	2	21,000 B	Glasgow	Clydebank	Bldg.	749,910	6 K.S.	5 K.S.	6 K.S.	.. 3–2	2 9·2-in. 12 6-in. 17 small Q.F., 9 l.	2	21·0	800 1600	755
b. 2nd c.	Barfleur	S shd	10,500	360 0	70 0	25 6	2	13,163	Chatham	Greenock Foundry	1894	599,089	12 comp.	12 comp.	9	.. 2½–2	4 10-in., 10 4·7-in. Q.F.§, 8 6-pr., 12 3-pr., 7 M., 2 l.	7 (2 sub.)	18·5	1240	625
a.c.	Bedford	S.	9800	440 0	66 0	24 6	2	22,000 B.	Fairfield	Fairfield Shipbg. Co	Bldg.	681,768	4 2 K.S.	5 K.S.	5 4 N.S.	.. 2–¾	14 6-in., 13 small Q.F.	2	23·0	800	500
c.b. 3rd c.	Bellerophon	I.	7550	300 0	56 1	26 7	1	4000	Chatham	Penn	1866	322,701	6	5	6	10	10 8-in., 4 6-in., 6 4-in., 4 6-pr. Q.F., 12 M., 4 l.	2	12·4	650	572

b. 2nd c.	**Benbow** .	. S.	10,600	330	0·68	6	27	3	2	11,500	Blackwall	Maudslay .	1888	760,820	18 *comp.*	16 *comp.*	14–2 *comp.*	12–15 3–2½	2 16·25-in., 10 6-in. Q.F., 12 6-pr., 10 3-pr., 7 M., 2 l.	5	16·75	1200	509
a.c.	**Berwick** .	. S.	9800	440	0·66	0	24	6	2	22,000 Nic.	W. Beard-more & Co.	Humphrys	Bl	726,441	4 2 H.S.	5 N.S.	5–4 N.S.	.. 2–¾ ..	14 6-in Q.F., 10 12-pr., 3 3-pr., 9 M.G.	2	23·0	800 1600	500
b. 1st cl	**Bulwark** .	. S.	15,000	400	0·75	0	26	9	2	15,000 B	Devonp't	Hawthorn	Bldg.	1,018,919	9 H.S.	12 H.S.	12–5 H.S.	3 2 ..	4 12-in., 12 6-in. Q.F., 24 small, 8 M.	2	18·0	900 2000	750
b. 1st cl.	**Cæsar** .	S.	14,900	390	0·75	0	27	6	2	12,000	Portsm'th	Maudslay .	1897	865,533	9 H.S.	14–9 H.S.	14–6 H.S.	.. 4–2½	4 12-in., 12 6-in. Q.F., 18 12-pr., 12 3 pr., 8 M., 2 l.	5 (4 sub.)	17·5	1850	757
b. 2nd c.	**Camperdown** .	. S.	10,600	330	0·68	6	27	3	2	11,500	Portsm'th	Maudslay .	1889	*x* 769,456	18 *comp.*	16 *comp.*	12 *comp.*	10–15 3–2½	4 13·5-in., 6 6-in. Q.F., 12 6-pr., 10 3-pr., 7 M., 2 l.	4	16·9	900 1200	515
b. 1st cl.	**Canopus** .	. S.	12,950	390	0·74	0	26	0	2	13,500 B	Portsm'th	Greenock Foundry	1900	869,598	6 H. S.	12 H. S.	12–5 H. S.	3–2 ..	4 12-in., 12 6-in. Q.F. 18 small Q.F., 2 l.	5 (4 sub.)	18·25	800 1850	700
a.c.	**Carnarvon**	. S.	10,200	450	0·67	0	24	6	2	22,000	..	..	..	..	4–2 K.S.	5 K.S.	5–4 N.S.	2 ¾ ..	2 7·5-in., 10 6-in., 10 12-pr., 3 3-pr. Q.F.	2	23·0	800	500
b. 2nd c.	**Centurion**	. S. shd.	10,500	360	0·70	0	25	6	2	13,214	Portsm'th	Greenock Foundry	1893	608,098	12 *comp.*	12 *comp.*	9 *comp.*	.. 2½–2	4 10-in., 10 4·7-in. Q.F.§ 8 6-pr., 12 3-pr., 7 M., 2 l.	7 (2 sub.)	18·25	1240	625
b. 2nd c.	**Collingwood**	. S.	9500	325	0·68	0	26	10	2	9500	Pembroke	Humphrys	1886	624,000	18 *comp.*	16 *comp.*	12 *comp.*	17–10 2½	4 12-in, 6 6-in., Q.F., 12 6-pr. 8 3-pr., 6 M., 2 l.	4	16·50	1200	480
t. 3rd c.	**Colossus** .	. S.	9420	325	0·68	0	26	3	2	5500	Portsm'th	Maudslay .	1886	646,786	18–11 *comp.*	16–13 *comp.*	16 *comp.*	22–10 3–2½	4 12-in., 5 6-in. Q.F., 4 6-pr., 10 3-pr., 6 M., 4 l.	2	14·2	979	388
b. 1st cl.	**Commonwealth**	S.	16,350	425	0·78	0	26	9	2	18,000	..	..	..	†	9 H.S.	12 H.S.	12 6 H.S.	.. 2 1	4 12-in., 4 9·2-in., 10 6-in., 24 small Q.F.	2	18·5	950	800
t. 3rd c.	**Conqueror**	. S.	6200	270	0·58	0	24	0	2	6000	Chatham	Humphrys	1882	418,433	12–8½	11½	12	13 2½–1¾	2 12-in., 4 6-in. Q.F., 6 6-pr., 12 M., 2 l.	6	15·3	650	330
a.c.	**Cornwall** .	. S.	9800	440	0·66	0	24	6	2	22,000 B.&W.	Pembroke	Hawthorn	Bldg.	730,899	4–2 H.S.	5 N.S.	5–4 N.S.	.. 2 ¾	14 6-in. Q.F., 10 12-pr., 3 3-pr., 9 M.	2	23·0	800 1600	500
b. 1st cl.	**Cornwallis**	. S.	14,000	405	0·75	6	26	6	2	18,000 B	Blackwall	Thames S. Co.	Bldg.	1,004,477	7 K.S.	14 K.S.	11–6 K.S.	..	4 12-in., 12 6-in Q.F., 12 12-pr., 6 3-pr.	4	19·0	900 2000	750
a.c.	**Cressy** .	. S. shd.	12,000	440	0·69	6	26	3	2	21,000 B	Fairfield .	Fairfield .	Bldg.	749,217	6 K.S.	5 K.S.	6 K.S.	.. 3–2	2 9 2-in., 12 6-in. Q.F., 17 small Q.F.	2	21·0	800 1600	755
a.c.	**Cumberland**	. S.	9800	440	0·66	0	24	6	2	22,000 B.	London & Glasgow Co.	London & Glasgow Co.	Bldg.	713,058	4–2 K.S.	5	5 4	.. 2 ¾	14 6-in. Q.F., 10 12-pr., 3 3-pr., 9 M.G.	2	23·0	800 1600	500

* When two set of figures are given the upper shows the coal capacity at load draught. † Details of cost incomplete. ‡ Unless mentioned this does not include armament.
x Includes Hydraulic Machinery, Gun Mountings, &c. ** See note relating to the new Vickers 6-in. gun on the previous page. § To be replaced by 6-in.

GREAT BRITAIN.—Armoured Ships—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Completion.	Cost.	Armour. Side.	Armour. Bulk-head.	Armour. Gun Position	Armour. Backing. Deck Plating	Armament. Guns.	Torpedo Tubes.	Speed.	Coals that can be carried in Bunkers.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					£	in.	in.	in.	in.			knots.	tons.	
a.c.	Devonshire	S.	10,200	450 0	67 0	24 6	2	22,000	Chatham	..	..	..	4–2 K.S.	5 K.S.	5–4 N. S.	.. 2–¾	2 7·5-in., 10 6-in., 10 12-pr., 33-pr. Q.F.	2	23·0	800	560
t. 3rd c.	Devastation	I.	9330	285 0	62 3	27 6	2	7000	Portsm'th	Maudslay	1873	353,848	12–10	12–10	14	18–16 3–2	4 10-in., 6 6-pr. Q.F., 8 3-pr., 5 M., 2 l.	2 (2 sub.)	14·0	1800	410
b. 1st cl.	Dominion	S.	16,350	425 0	78 0	26 9	2	18,000	..	..	..	†	9 K.S.	12 K.S.	12 6 K.S.	.. 2–1	4 12-in., 4 9·2-in., 10 6-in., 24 small Q.F.	2	18·5	950	800
a.c.	Donegal	S.	9800	440 0	66 0	24 6	2	22,000 B.	Fairfield	Fairfield Co.	Bldg.	704,561	4–2 K.S.	5 K.S.	5–4	.. 2–¾	14 6-in. Q.F., 10 12-pr., 3 3-pr., 9 M.	2	23·0	800 1600	500
a.c.	Drake	S.	14,100	500 0	71 0	26 0	2	30,000 B	Pembroke	Humphrys	Bldg.	974,320	6 K.S.	5 K.S.	6–5 K.S.	.. 3–2	2 9·2-in., 16 6-in. Q.F., 14 12-pr., 3 3-pr.	2	23·0	1250 2500	900
t. 3rd c.	Dreadnought	I.	10,820	320 0	63 10	26 9	2	6500	Pembroke	Humphrys	1875	592,573	14	13	14	18–15 3–2	4 12·5-in. M.L.R., 6 6-pr. Q.F., 12 3-pr., 7 M., 2 l.	2	13·7	1200	453
b. 1st cl.	Duncan	S.	14,000	405 0	75 6	26 6	2	18,000 B	Blackwall	Thames S. Co.	Bldg.	1,003,778	7 K.S.	14 K.S.	11–6 K.S.	..	4 12-in., 12 6-in., 12 12-pr. Q.F., 6 3-pr.	4	19·0	900 2000	750
t. 3rd c.	Edinburgh	S.	9420	325 0	68 0	26 3	2	5500	Pembroke	Humphrys	1886	642,333	18–14 comp.	16–13 comp.	16 comp.	22–10 3–2½	4 12-in., 5 6-in. Q.F., 4 6-pr., 10 3-pr., 6 M., 2 l.	2	14·2	970	388
b. 1st cl.	Empress of India	S.	14,000	380 0	75 0	27 6	2	13,000	Pembroke	Humphrys	1893	838,087	18–5 comp.	16 comp.	17–6 comp.	.. 3	4 13·5-in., 10 6-in. Q.F., 16 6-pr., 12 3-pr., 8 M., 2 l.	7 (2 sub.)	17·5	1800	740
a.c.	Essex	S.	9,800	440 0	66 0	24 6	2	22,000 B	Pembroke	John Brown	Bldg.	699,274	4–2 K.S.	5	5–4	.. 2–¾	14 6-in., 13 small Q.F.	..	23·0	800 1600	500
a.c.	Euryalus	S shd.	12,000	440 0	69 6	26 3	2	21,000 B	Barrow	Vickers	Bldg.	766,759	6 K.S.	5 K.S.	6 K.S.	4 3–2	2 9·2-in., 12 6-in. Q.F., 14 12-pr., 3 3-pr., 8 M.	2	21·0	800 1600	755
b. 1st cl.	Exmouth	S.	14,000	405 0	75 6	26 6	2	18,000 B	Laird	Laird	Bldg.	1,022,032	7 K.S.	14 K.S.	11–6 K.S.	..	4 12-in., 12 6-in., 12 12-pr. Q.F., 6 3-pr.	4	19.0	900 2000	750
b. 1st cl.	Formidable	S.	15,000	400 0	75 0	26 9	2	15,000 B	Portsm'th	Earle	Bldg.	1,012,780	9 H.S.	12 H.S.	12–5	.. 3–2	4 12-in., 12 6-in., 24 small Q.F., 8 M.	..	18·0	900 2000	750
a.c.	Galatea	S.	5600	300 0	56 0	24 6	2	8500	Glasgow	Napier	1889	258,390	10 comp.	16 comp.	4½	6 3–2	2 9·2-in., 10 6-in., Q.F.C., 6 6-pr. 10 3-pr., 6 M., 3 l.	4	18·1	900	484

c.d.s. *t.*	Glatton .	I.	4910	245	0 54	0	19	5	2	2000	Chatham	Laird .	1872	219,529	1 –10	12	14	20 3–1½	2 12-in. M.L.R., 3 6-pr. Q.F., 4 M., 1 l.		11·0	540	192
b. 1st cl	Glory .	S.	12,950	390	0 74	0	26	0	2	13,500 B	Laird	Laird .	Bldg.	844,057	6 H.S.	12 H.S.	12–5 H.S.	.. 3-2	4 12-in., 12 6-in. Q.F., 18 smaller Q.F., 2 l.	5 (4 sub.)	18·25	800 1850	700
b. 1st cl	Goliath .	S.	12,950	390	0 74	0	26	0	2	13,500 B	Chatham.	Penn .	1900	860,788									
a.c.	Good Hope .	S.	14,100	500	0 71	0	26	0	2	30,000 B	Fairfield .	Fairfield .	Bldg.	976,569	6 K.S.	5 K.S.	6–5 K.S.	.. 3–2	2 9·2-in., 16 6-in., 17 small Q.F.	2	23·0	1250 2500	900
a.c.	Hampshire	S.	10,200	450	0 67	0	24	6	2	22,000	..	..	..	..	4–2 K.S.	5 K.S.	5–4 N.S.	.. 2–¾	2 7·5-in., 10 6-in., 10 12-pr. Q.F.	2	23·0	800 1600	500
b. 1st cl	Hannibal .	S.	14,900	390	0 75	0	27	6	2	12,000	Pembroke	Harland	1897	867,403	9 H.S.	14–9 H.S.	14-6 H.S.	.. 4–2½	4 12-in., 12 6-in. Q.F., 18 12-pr., 12 3-pr., 8 M., 2 l.	5 (4 sub.)	17·5	1850	757
c.b. 3rd c	Hercules .	I.	8680	325	0 59	0½	26	6	1	8500	Chatham	Penn .	1868	361,134	9–6	6–5	9	12–10	8 10-in. M.L.R., 2 9-in. do., 2 7-in. do., 2 6-in. Q.F., 6 4·7-in., 9 6-pr., 13 3-pr., 7 M., 2 l.	4	14·6	610	638
t. 3rd c	Hero .	S.	6200	270	0 58	0	24	0	2	6000	Chatham	Rennie .	1888	397,271	12 *comp.*	11½ *comp.*	12 *comp.*	13½ 2½–1¾	2 12-in., 4 6-in. Q.F., 7 6-pr., 12 M., 2 l.	6	15·2	620	330
a.c.	Hogue .	S. shd.	12,000	440	0 69	6	26	3	2	21,000 B	Barrow .	Vickers .	1902	741,893	6 K.S.	5 K.S.	6 K.S.	4 3	2 9·2-in., 12 6-in., 17 small Q.F.	2	22·0	800 1600	755
t. 1st cl.	Hood .	S.	14,150	380	0 75	0	27	6	2	13,000	Chatham	Humphrys	1893	830,536	18 *comp.*	17 *comp.*	18–6 *comp.*	.. 3	4 13·5-in., 10 6-in. Q.F., 10 6-pr., 12 3-pr., 8 M., 2 l.	7 (2 sub.)	17·5	900 1800	730
c.d.s. *t.*	Hotspur .	I.	4010	235	0 50	0	21	10	2	2500	Glasgow .	Napier .	1871	171,528	11 & 8	8	10–8½	15–10 2–1	2 12-in. M.L.R., 2 6-in. Q.F., 6 12-pr., 4 3-pr. Q.F., 8 M., 2 l.	..	11·25	300	232
b. 1st cl	Howe .	S.	10,300	325	0 68	0	27	3	2	11,500	Pembroke	Humphrys	1889	667,022	18 *comp.*	16 *comp.*	11½ *comp.*	15–12 3–2½	4 13·5-in., 6 6-in. Q.F., 12 6-pr., 10 3-pr., 7 M., 2 l.	1	16·8	1200	515
b. 1st cl.	Illustrious	S.	14,900	390	0 75	0	27	6	2	12,000	Chatham	Penn .	1898	885,945	9 H.S.	14–9 H.S.	14-6 H.S.	.. 4–2½	4 12-in., 12 6-in. Q.F., 18 12-pr., 12 3-pr., 8 M., 2 l.	5 (4 sub.)	17·5	1850	757
a.c.	Immortalité .	S.	5600	300	0 56	0	22	6	2	8500	Chatham	Earle .	1889	278,500	10 *comp.*	16 *comp.*	4½	6 3–2	2 9·2-in., 10 6-in. Q.F., 6 6-pr., 10 3-pr., 6 M., 3 l.	2	18·0	900	484
a.c.	Impérieuse .	S. shd.	8400	315	0 62	0	27	4	2	10,000	Portsm'th	Maudslay	1886	*x* 530,814	10 *comp.*	9 *comp.*	4½ *comp.*	10 4–2	4 9·2-in., 10 6-in. Q.F., 8 6-pr., 10 3-pr., 6 M., 2 l.	6	16·7	900 1130	544

* Details of cost incomplete.

x Includes Hydraulic Machinery, Gun Mountings, &c.

GREAT BRITAIN.—Armoured Ships—*continued.*

Class	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Completion.	Cost.	Armour. Side.	Armour. Bulk-head.	Armour. Gun Position.	Armour. Back-ing. Deck Plating.	Armament. Guns	Armament. Torpedo Tubes.	Speed.	Coals that can be carried in Bunkers.	Complement.
			tons.	ft. in.	ft. in.	ft. in	no.					£	in.	in.	in.	in.			knots.	tons.	
t. 2nd c.	Inflexible .	I.	11,880	320 0	75 0	26 4	2	6500	Portsm'th	Elder	. 1881	795,268	24–16	22–14	17 *comp.*	17–25 3	4 16-in. M.L.R., 8 4-in., 4 6-pr. Q.F., 2 3-pr., 15 M., 2 l.	4 (2 sub.)	12·8	1300	485
b. 1st cl.	Implacable	S.	15,000	400 0	75 0	26 9	2	15,000 B	D'port	Laird	1902	1,002,909	9 K.S.	12 K.S.	12–5 K.S.	.. 3–2	4 12-in., 12 6-in., 24 small Q.F., 8 M.	2	18·0	900 2000	755
	Irresistible								Chatham	Maudslay		986,731									
	London .								Portsm'h	Earle		1,023,671									
a.c.	Kent . .	. S.	9800	440 0	66 0	24 6	2	22,000 B.	Portsm'th	Hawthorn	Bldg.	694,895	4–2 K.S.	5 K.S.	5–4 N.S.	.. 2 ¾	14 6-in. Q.F., 13 smaller guns.	..	23·0	800 1600	500
a.c.	King Alfred	S.	14,100	500 0	71 0	26 0	2	30,000 B	Barrow .	Vickers	Bldg.	966,712	6–5 4 K.S.	5 K.S.	6–5 K.S.	4–5–6 2½–1	2 9·2-in., 16 6-in. Q.F., 14 12-pr., 3 3-pr., 9 l.	2	23·0	1250 2500	900
	Leviathan .								Clydeb'k	Clydeb'k		1,001,857									
b. 1st cl.	King Edward VII.	S.	16,350	425 0	78 0	26 9	2	18,000	Devonp'rt	..	Bldg.	*	9 K.S.	12 K.S.	12 6 N.S.	.. 2 1	4 12-in., 4 9·2-in., 10 6-in., 24 small Q.F.	2	18·5	950	800
a.c.	Lancaster .	S.	9800	440 0	66 0	24 6	2	22,000 B.	Elswick .	Hawthorn	Bldg.	716,770	4–2 K.S.	5 K.S.	5–4 N.S.	.. 2 ¾	14 6-in. Q.F., 10 12-pr., 3 3-pr., 9 M.G.	2 2	23·0	800 1600	500
b 1st cl.	Jupiter .	. S.	14,900	390 0	75 0	27 6	2	12,000	Clydeb'nk	Thomson	. 1897	901,216									
b 1st cl.	Magnificent	. S.	14,900	390 0	75 0	27 6	2	12,000	Chatham	Penn	1895	912,291	9 H.S.	14–9 H.S.	14–6 H.S.	.. 4–2½	4 12-in., 12 6-in. Q.F., 18 12-pr., 12 3-pr., 8	5 (4 sub.)	17·5	1850	757
b 1st cl.	Majestic .	. S.	14,900	390 0	75 0	27 6	2	12,000	Portsm'th	Barrow	1895	910,632									
b 1st cl.	Mars .	. S.	14,900	390 0	75 0	27 6	2	12,000	Birkenh'd	Laird	. 1897	902,631									
t. 3rd c.	Monarch .	. I.	8930	330 0	57 6	26 7	1	8216	Chatham	Maudslay	1869	354,575	7–6	5–4½	8	12	4 12-in. M.L.R., 2 9-in. do., 1 7-in. do., 4 12-pr. Q.F., 10 3-pr., 6 M., 2 l.	2	15·0	630	598
a.c.	Monmouth	. S.	9800	440 0	66 0	24 6	2	22,000 B.	Glasgow	London & Glasgow Shipbg. Co.	Bldg.	666,288	4–2 K.S.	5 K.S.	5–4 N.S.	.. 2 ¾	14 6-in. B.L., 13 small Q.F.	..	23·0	800 1600	500

b. 1st cl.	**Montagu** . .	S.	14,000	405	0 75	6	26	6	2	18,000 B.	Devonport	Laird .	..	1,013,437	7 K.S.	14 K.S.	11·6 N.S.	4–6 **2–1**	4 12-in., 12 6-in., 12 12-pr., 6 3-pr., 2 M., 2 l.	4	19·0	900 2000	750
a.c.	**Narcissus** .	S.	5600	300	0 56	0	24	6	2	8500	Hull	Earle	1889	257,390	10 *comp.*	16 *comp.*	4½	6 **3–2**	2 9·2-in., 10 6-in. Q.F., 6 6-pr., 10 3-pr., 6 M., 3 l.	4	18·1	750 900	484
t. 1st cl.	**Nile** . . .	S.	11,940	345	0 73	0	27	6	2	12,000	Pembroke	Maudslay	1890	819,717	20–16 *comp.*	18–14 *comp.*	18 *comp.*	6 **3**	4 13·5-in., 6 6-in. Q.F., 8 6-pr., 12 3-pr., 7 M., 3 l.	6 (2 sub.)	16·7	1200	558
b. 1st cl	**Ocean** . .	S.	12,950	390	0 74	0	25	5	2	13,500 B	Devonport	Hawthorn	1900	881,248	6 H.S.	12 H.S.	12–5 H.S.	3–2	4 12-in., 12 6-in. Q.F., 18 smaller Q.F., 2 l.	5 (4 sub.)	18·25	800 1850	700
s.d.s.	**Orion** . .	I.	4870	245	0 52	0	21	4	2	2600	Poplar	Maudslay	1882	292,229	12–7	9–5	8	16–9 **3–1**	4 12-in. M.L.R., 6 6-pr. Q.F., 6 M., 2 l.	4	11·9	520	284
a.c.	**Orlando** . .	S.	5600	300	0 56	0	24	8	2	8500	Jarrow	Palmer	1888	266,812	10 *comp.*	16 *comp.*	4½ *comp.*	6 **3–2**	2 9·2-in., 10 6-in. Q.F., 6 6-pr., 10 3-pr., 7 M., 3 l.	2	18·1	900	484
s.d.s. *c.b.*	**Penelope** . .	I.	4470	260	0 50	0	17	6	2	2700	Pembroke	Maudslay	1868	186,848	6–5	4½	5	10–11	8 9-ton M.L.R., 4 3-pr. Q.F., 11 M., 4 l.	..	11·0	470	265
b. 1st cl.	**Prince George** .	S.	14,900	390	0 75	0	27	6	2	12,000	Portsm'th	Humphrys	1896	885,037	9 H.S.	14–9 H.S.	14–6 H.S.	.. **4–2½**	4 12-in., 12 6-in. Q.F., 18 12-pr., 12 3-pr., 2 l.	5 (4 sub.)	17·5	1850	757
b. 1st cl	**Prince of Wales**	S.	15,000 B.	400	0 75	0	26	9	2	15,000	Chatham	Greenock Foundry	Bldg.	*									
															9 K.S.	12 K.S.	12 6 N.S.	.. **2 1**	4 12-in., 12 6-in., 16 12-pr., 2 8-cwt., 6 3-pr. Q.F., 8 4·5-in. M G.	4	18	900	755
b. 1st cl.	**Queen** . .	S.	15,000 B.&W.	400	0 75	0	26	9	2	15,000	Devonport	Harland & Wolff	Bldg.	*									
b. 1st cl.	**Renown** . .	S. shd.	12,350	380	0 72	0	26	9	2	12,000	Pembroke	Maudslay	1896	696,425	8–6 H.S.	10–6 H.S.	10 H.S.	.. **3–2**	4 10-in., 10 6-in. Q.F., 14 12-pr., 15 smaller Q.F.	5 (2 sub.)	18·0	1800	674
b. 1st cl.	**Ramillies** . .	S.	14,000	380	0 75	0	27	6	2	13,000	Glasgow	Thomson	1893	874,255									
b. 1st cl.	**Repulse** . .	S.	14,000	380	0 75	0	27	6	2	13,000	Pembroke	Humphrys	1894	841,274	18–5 *comp.*	16 *comp.*	17 *comp.*	.. **3**	4 13·5-in., 10 6-in. Q.F., 16 6-pr., 12 3-pr., 8 M., 2 l.	7 (2 sub.)	17·5	1800	730
b. 1st cl.	**Resolution** .	S.	14,000	380	0 75	0	27	6	2	13,000	Jarrow	Palmer	1893	852,755									

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GREAT BRITAIN.—Armoured Ships—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Completion.	Cost.	Armour. Side.	Armour. Bulk-head	Armour. Gun Position	Armour. Backing. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in	ft. in	no.					£	in.	in.	in.	in.			knots.	tons.	
b. 1st cl.	**Revenge**	S.	14,000	380 0	75 0	27 6	2	13,000	Jarrow	Palmer	1895	852,755									
b. 1st cl	**Royal Oak**	S.	14,000	380 0	75 0	27 6	2	13,000	Birkenh'd	Laird	1894	877,378	18–5 *comp.*	16 *comp.*	17 *comp.*	.. 3	4 13·5-in., 10 6-in. Q.F., 16 6-pr., 12 3-pr., 8 M., 2 l.	7 (2 sub.)	17·5	900 1800	730
b. 1st cl.	**Royal Sovereign**	S.	14,000	380 0	75 0	27 6	2	13,312	Portsm'th	Humphrys	1892	824,583									
b. 1st cl.	**Rodney**	S.	10,300	325 0	68 0	27 3	2	11,500	Chatham	Humphrys	1888	669,278	18 *comp.*	16 *comp.*	11 *comp.*	15–12 3–2½	4 13·5 in., 6 6-in. Q.F., 12 6-pr., 10 3-pr., 6 M., 2 l.	4	16·75	1200	515
a.c.	**Roxburgh**	S.	10,200	450 0	67 0	24 6	2	22,000	..	..	..	..	4–2 K.S.	5 K.S.	5–4 N.S.	.. 2–¾	2 7·5-in., 10 6-in., 10 12-pr., 33-pr. Q.F.	2	23·0	800 1600	500
c.d.s. *t.*	**Rupert**	I.	5440	250 0	53 0	23 7	2	6000	Chatham	Portsm'th	1874	232,677	11–9	12	14–12	14–10 3–2	2 9·2-in., 2 6-in. Q.F., 4 6-pr., 6 3-pr., 2 M., 2 l.	4	14·0	480	203
b. 1st cl	**Russell**	S.	14,000	405 0	75 6	26 6	2	18,000 B	Jarrow	Palmer	1902	1,026,292	7 K.S.	14 K.S.	11–6 K.S.	4 6 2–1	4 12-in., 12 6-in., 12 12-pr. Q.F., 6 3-pr.	4	19·0	900 2000	750
t. 1st cl.	**Sans Pareil**	I.	10,470	340 0	70 0	27 3	2	14,000	Blackwall	Humphrys	1889	719,442	16–18 *comp.*	16 *comp.*	18 *comp.*	6 3	2 16·25in., 1 10-in., 12 6-in. Q.F., 12 6-pr., 12 3-pr., 8 M., 2 l.	6 (2 sub.)	17·2	1200	583
a.c.	**Suffolk**	S	9800	440 0	66 0	24 6	2	22,000 Nic.	Portsm'th	Humphrys	Bldg.	759,144	4–2 K.S.	5 K.S.	5–4 N.S.	.. 2–¾	14 6-in. Q.F., 10 12-pr., 3 3-pr., 9 M.G.	2	23·0	800 1600	500
c.b. 3rd c.	**Sultan**	I.	9290	325 0	59 0½	27 6	1	8000	Chatham	Thomson	1871	357,415	9–6	6–4½	9–8	12–10	8 10-in. M.L.R., 4 9-in. do., 4 4·7-in. Q.F., 9 6-pr., 13 3-pr., 7 M., 2 l.	4	14·0	810	661
a.c.	**Sutlej**	S. shd.	12,000	440 0	69 6	26 3	2	21,000 B	Clydeb'nk	Clydebank Company	Bldg.	751,606	6 K.S.	5 K.S.	6 K.S.	.. 3–2	2 9·2-in., 12 6-in., 17 small Q.F.	2	21·0	800 1600	755

t. 2nd c.	Thunderer .	I.	9330	285	0	62	3	27	0	2	7000	Pembroke	Maudslay	1877	358,542	12–10	12–10	14–12	18–16 3–2	4 10-in., 6 6-pr. Q.F., 8 3-pr., 4 M., 2 l.	2	14·0	1600	592
t. 1st cl.	Trafalgar .	S.	11,940	345	0	73	0	27	6	2	12,000	Portsm'th	Humphrys	1890	862,794 *x*	20–16 *comp.*	18–14 *comp.*	18 *comp.*	6 3	4 13·5 in., 6 6-in. Q.F., 8 6-pr., 12 3-pr., 6 M., 3 l.	6 (2 sub.)	16·7	1200	572
a.c.	Undaunted .	S.	5600	300	0	56	0	22	6	2	8500	Jarrow .	Palmer .	1889	256,055	10 *comp.*	16 *comp.*	4½ *comp.*	6 3–2	2 9·2-in., 10 6-in. Q.F., 6 6-pr., 10 3-pr., 7 M., 3 l.	4	18·1	750 900	484
b. 1st cl.	Victorious .	S.	14,900	390	0	75	0	27	6	2	12,000	Chatham	Hawthorn	1897	868,313	9 H.S.	14–9 H.S.	14–6 H.S.	.. 4–2½	4 12-in., 12 6-in. Q.F., 18 12-pr., 12 3-pr., 8 M., 2 l.	5 (4 sub.)	17·5	1850	757
b. 1st cl.	Venerable. .	S.	15,000	400	0	75	0	26	9	2	15,000 B	Chatham	Maudslay	1902	1,010,863	7 K.S.	14 K.S.	11–6 K.S.	4–6 2–1	4 12-in., 12 6-in., 24 small Q.F., 8 M.	2	18·0	900 / 2000	755
b. 1st cl.	Vengeance .	S.	12,950	390	0	74	0	26	0	2	13,500 B	Barrow .	Vickers .	1901	814,619	6 H.N.S.	12 H.N.S.	12–6 H.S.	4 2–1	4 12-in., 12 6-in. Q.F., 12 12-pr., 6 3-pr., 8 M.	4	18·5	800 1850	750
a.c.	Warspite . .	S.	8400	315	0	62	0	27	4	2	10,000	Chatham	Penn .	1888	529,332	10 *comp.*	9 *comp.*	8 *comp.*	10 3–2	4 9·2-in., 10 6-in. Q.F., 4 6-pr. Q.F., 9 3-pr., 6 M., 2 l.	6	16·7	1130	535
b.	2 new ships . (Programme 1902–3.)	S.	Design not settled.††																					
a.c.	2 new ships . (Programme 1902–3.)	S.	„ „ „ ‡‡																					

The following, which appear in the Official Navy List, are lent to India and Australia:—

c.d.s. t.	Abyssinia* (*Indian Marine.*)	I.	2900	225	0	42	0	14	6	2	900	Poplar	Dudgeon	1870	116,549	7–6	8–7	10–8	11–9 1½–1	4 8-in. 14-ton, 7 M., 2 l.	..	9·0	92	193
c.d.s. t.	Cerberus† . (*Victorian Marine.*)	I.	3480	225	0	45	0	15	3	2	1660	Jarrow	Maudslay	1870	117,556	8–6	9–8	10–9	11–9 1–1½	4 10-in. 18-ton M.L.R., 4 M.	..	9·75	120	196
c.d.s. t.	Magdala*. (*Indian Marine.*)	I.	3340	225	0	45	0	15	3	2	1400	Blackwall	Ravenhill	1870	132,400	8–6	9–8	10–9	11–9 1½–1	4 8-in. 14-ton, 7 M., 2 l.	..	10·0	120	194

x Includes Hydraulic Machinery, Gun Mountings, &c. * At Bombay. † At Melbourne.
†† One at Portsmouth, one by contract. ‡‡ One at Pembroke, one by contract. Reported displacement, 10,800 tons.

GREAT BRITAIN.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons	ft. in.	ft. in.	ft. in.	no.					£	in.	in.			knots.	tons.	
2nd cl. Cr.	Æolus	S. shd.	3600	300 0	43 0	17 6	2	9000	Devonp'rt	Hawthorn	1892	208,450	2	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	19·75	400	273
Dsp. Ves.	Alacrity	S.	1700	250 0	32 6	14 0	2	3000	Jarrow	Palmer	1885	77,969	..	..	10 6-pr. Q.F., 2 M.	..	17·00	400	114
T. G. B.	Alarm	S.	810	230 0	27 0	8 9	2	3884	Sheerness	Penn	1892	59,346	2	..	2 4·7-in. Q.F., 4 3-pr. do.	3	19·25	100	91
2nd cl. G. B.	Albacore	C.	560	135 0	26 0	10 6	1	500	Birkenh'd	Laird	1883	28,556	..	..	2 5-in., 2 4-in., 2 M.	..	11·0	85	59
Sloop	Alert	S. shd.	960	180 0	32 6	11 6	1	1400	Sheerness	Sheerness	1894	60,309	..	..	6 4-in. 25-pr. Q.F., 4 3-pr., 2 M.	..	13·25	130	101
,,	Algerine	S.	1050	185 0	32 6	11 3	2	1400	Devonp'rt	Devonport	1895	63,904	0·22	..	6 4-in. 25-pr. Q.F., 4 3-pr., 3 M.	..	13·0	160	106
3rd cl. Cr.	Amethyst	S.	3000	360 0	40 0	14 6	..	9800	..	..	Pro.	..	..	..	12 4-in., 8 3-pr.	..	21·75	300	..
2nd cl. Cr.	Amphion	S.	4300	300 0	46 0	20 6	2	5000	Pembroke	Maudslay	1883	160,500	..	1½	10 6-in. Q.F., and 14 smaller and M.	4	16·6	550 / 1000	309
,, ,,	Andromache	S.	3400	300 0	43 0	16 6	2	9000	Chatham	Earle	1890	186,280	2	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1l.	4	20·0	400	273
,, ,,	Apollo	S.	3400	300 0	43 0	16 6	2	9000	Chatham	Earle	1891	186,361							
1st cl. Cr.	Andromeda	S. shd.	11,000	435 0	69 0	25 3	2	16,500 B	Pembroke	Hawthorn	1897	575,146	3	3–6	16 6-in., 17 small Q.F., 2 12-pr. boat.	3 (2 sub.)	20·5	1000	600
T. G. B.	Antelope	S.	810	230 0	27 0	8 9	2	3621	Devonp'rt	Yarrow	1893	61,397	2	..	2 4·7-in. Q.F., 4 3-pr.	3	19·25	100	91
3rd cl. Cr.	Archer	S.	1770	225 0	36 0	14 6	2	3500	Glasgow	Thomson	1885	£87,583	..	..	6 6-in. Q.F., 8 3-pr., 2 M., 1 l.	3	16·5	475	172

1st cl. Cr.	Argonaut	S. shd.	11,000	435	0 69	0 25	3	2	18,000 B	Fairfield	Fairfield	1898	535,557							
„ „	Ariadne	S. shd.	11,000	435	0 69	0 25	3	2	18,000 B	Clydeb'nk	John Brown	1898	543,705	3–6 H. S.	4	16 6-in. Q.F., 14 12-pr., 11 smaller Q.F. and M.	3 (2 sub.)	20·75	1000	677
„ „	Amphitrite	S. shd.	11,000	435	0 69	0 25	3	2	18,000 B	Barrow	Vickers	1898	546,227							
2nd cl. Cr.	Arethusa	S.	4300	300	0 46	0 20	6		5000	Glasgow	Napier	1882	145,198		1½	10 6-in. Q.F., 8 3-pr., 6 M., 2 l.	4	16·6	500/1000	309
„ „	Arrogant	S.	5800	320	0 57	6 21	0	2	10,000 B	Devonp'rt	Earle	1896	278,878	3 N.S.	1–2 N.S.	10 6-in. Q.F., 9 12-pr., 3 3-pr., 1 12-pr. boat, 5 M.	2	19·1	500	480
„ „	Astræa	S. shd.	4360	320	0 49	6 19	0	2	9112	Devonp'rt	Devonport	1893	244,831	2	2–1	2 6-in. Q.F., 8 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	19·75	400	312
3rd cl. Cr.	Barham	S.	1830	280	0 35	0 13	3	2	4700 T	Portsm'th	Hawthorn	1889	113,302	2	2–1	6 4·7-in. Q.F., 4 3-pr., 2 M.	2	18·6	140	169
„ „	Bellona	S.	1830	280	0 35	0 13	3	2	4700 T	Newcastle	Hawthorn	1890	94,195	2	2–1	6 4·7-in. Q.F., 4 3-pr., 2 M.	2	17·8	140	169
„ „	Barracouta	S.	1580	220	0 35	0 14	0	2	3000	Sheerness	Palmer	1889	96,315							
„ „	Barrosa	S.	1580	220	0 35	0 14	0	2	3000	Portsm'th	Palmer	1889	79,238	2	2–1	6 4·7-in. Q.F., 4 3-pr., 3 M.	2	16·5	160	159
„ „	Blanche	S. shd.	1580	220	0 35	0 14	0	2	3000 L	Pembroke	Laird	1889	91,112							
„ „	Blonde*	S. shd.	1580	220	0 35	0 14	0	2	3000 L	Pembroke	Laird	1889	90,059							
Sloop	Basilisk	S. shd.	1170	195	0 28	0 12	6	2	2000	Sheerness	Rennie	1889	58,013	..	..	8 5-in., 8 M.	..	14·7	160	138
„	Beagle	S. shd.	1170	195	0 28	0 12	6	2	2000	Portsm'th	Rennie	1889	56,474							
1st cl. Cr.	Blake	S.	9000	375	0 65	0 25	9	2	20,000	Chatham	Maudslay	1889	440,471	6	6–3	2 9·2-in., 10 6-in. Q.F., 16 3-pr. Q.F., 7 M., 2 l.	4 (2 sub.)	21·5	1500	570
„ „	Blenheim	S.	9000	375	0 65	0 25	9	2	21,411	Blackwall	Humphrys	1890	425,591							

x Includes Gun Mountings, &c.

* Being reboilered with water tube-boilers of small tube type.

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft.	in.	ft.	in.	ft.	in.	no.					£	in.	in.			knots.	tons.	
2nd cl. Cr.	Bonaventure	S. shd	4360	320	0	49	6	19	0	2	9000	Devonp'rt	Hawthorn	1892	247,128	2	2–1	2 6-in. Q.F., 8 4·7-in. Q.F., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	19·5	400	312
T. G. B.	Boomerang (Australia)	S.	735	230	0	27	0	8	3	2	3500	Elswick	Bellis	1889	49,962	2	..	2 4·7-in. Q.F., 4 3-pr., 1 M.	3	20·0	100	91
2nd cl. Cr.	Brilliant	S. shd.	3600	300	0	43	8	17	6	2	9164	Sheerness	Hawthorn	1891	204,228	2	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	19·7	400	273
3rd cl. Cr.	Brisk	S.	1770	225	0	36	0	14	3½	2	3500	Glasgow	Thomson	1886	87,583	..	..	6 6-in. Q.F.C., 8 3-pr., 2 M., 1 l.	3	16·5	325	172
1st cl. G. B.	Framble	S.	700	180	0	33	0	8	0	2	1300 Y	Liverpool	Fawcett & Co.	1898	50,461	..	..	2 4-in., 4 12-pr. Q.F.	..	13·5	50	85
,, ,,	Eritomart	S.	700	180	0	33	0	8	0	2	1300 Y	Liverpool	Fawcett & Co.	1898	50,401	..	..	2 4-in., 4 12-pr. Q.F.	..	13·5	50	85
Sloop	Cadmus, Clio	S. shd.	1070	185	0	33	0	11	3	2	1400	Sheerness	Sheerness	Bldg.	Details not complete.	..	..	6 4-in. and 4 3-pr. Q.F.	..	13·0 to 13·25	160	150
Sloop	Buzzard	C.	1140	195	0	28	0	11	6	2	2000	Sheerness	Barrow	1887	58,700	..	..	8 5-in., 8 M.	2	14·50	160	138
3rd cl. Cr.	Calliope	S. shd.	2770	235	0	44	6	19	11	1	4020	Portsm'th	Rennie	1884	120,000	..	1½	4 6-in., 12 5-in. 38-cwt., 9 M., 2 l.	2	14·6	550	293
,, ,,	Calypso	S. shd.	2770	235	0	44	6	19	11	1	4000	Chatham	Rennie	1883	119,500							
2nd cl. Cr.	Cambrian	S. shd.	4360	320	0	49	6	19	0	2	9000	Pembroke	Hawthorn	1893	236,919	2	2–1	2 6-in. Q.F., 8 4·7-in., 8 6-pr., 1 3-pr., 4 M, 1 l.	4	19·5	400	312
2nd cl. Cr.	Challenger	S.	5880	355	0	56	0	21	3	2	12,500 B & W	Chatham	Wallsend Eng'ng Co.	Bldg.	381,131	..	..	11 6-in. B.L., and 15 small Q.F.	..	20·75 to 21·0	500	..
3rd cl. Cr.	Champion	S. shd.	2380	225	0	44	6	19	3	1	2000	Glasgow (Fairfield)	Elder	1878	113,983	..	1½	4 6-in., 8 5-in., 4 3-pr., Q.F., 6 M., 2 l.	2	12·75	470	265

3rd cl. Cr.	Cleopatra	S. shd.	2380	225	0 44	6 19	3	1	2000	Glasgow (Fairfield)	Humphrys	1878	113,924	..	1½	4 6-in., 8 5-in., 4 3-pr. Q.F., 6 M., 2 l.	2	13·0	470	265
„ „	Comus	S. shd.	2380	225	0 44	6 19	3	1	2000	Glasgow (Fairfield)	Elder	1878	113,974	..	1½	10 6-in., 7 M., 2 l.	2	12·75	470	265
„ „	Cordelia	S. shd.	2380	225	0 44	6 19	3	1	2000	Portsm'th	Rennie	1881	104,500	..	1½	10 6-in., 9 M., 2 l.	2	12·75	470	265
Sloop	Condor *	S. shd.	980	180	0 33	3 11	6	2	1400 B	Sheerness	Thames	1898	65,185	..	..	6 4-in. Q.F., 4 3-pr.	..	13·25	130	130
2nd cl. Cr.	Charybdis	S. shd.	4360	320	0 49	6 19	0	2	9000	Sheerness	Earle	1893	237,344	2	2–1	2 6-in. Q.F., 8 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	19·5	400	312
T. G. B.	Circe †	S.	810	230	0 27	0 8	9	2	3500	Sheerness	Penn	1892	61,979	2	..	2 4·7-in. Q.F., 4 3-pr.	3	19·25	100	91
2nd cl. G. B.	Cockchafer	C.	465	125	0 23	6 9	6	1	360	Pembroke	Maudslay	1881	77,000	..	..	2 64-pr. M.L.R., 2 20-pr., 2 M.	..	9·8	40	61
3rd cl. Cr.	Cossack	S	1770	225	0 36	0 14	3½	2	3500	Glasgow	Thomson	1886	*x* 87,583	..	..	6 6-in. Q.F., 8 3-pr., 2 M., 1 l.	3	16·5	325	172
1st cl. Cr.	Crescent	S. shd.	7700	360	0 60	0 23	9	2	12,000	Portsm'th	Penn	1892	383,068	6	5–1	1 9·2-in., 12 6-in. Q.F., 12 6-pr., 5 3-pr., 7 M., 2 l.	4 (2 sub.)	19·7	850	560
3rd cl. Cr.	Curaçoa	S. shd.	2380	225	0 44	6 19	3	1	2000	Glasgow (Fairfield)	Humphrys	1878	112,931	..	1½	4 6-in., 8 5-in., 1 3-pr. Q.F., 9 M., 2 l.	2	13·0	470	265
G. V.	Curlew	S.	950	195	0 28	0 10	6	2	1200	Devonp'rt	Penn	1885	*x* 49,963	..	..	1 6-in., 3 5-in., 7 light Q.F. and M.	1	14·5	250	103
Sloop	Daphne	C.	1140	195	0 28	0 11	6	2	2000	Sheerness	Greenock F'ndry Co.	1888	*x* 57,600	..	..	8 5-in., 8 M.	..	14·0	160	138
1st cl. Cr.	Diadem	S. shd.	11,000	435	0 69	0 26	0	2	16,500 B	(Fairfield)	Fairfield	1896	550,127	4½–2	4–2½	16 6-in. Q.F., 14 12-pr., 11 light Q.F. and M.	3 (2 sub.)	20·5	1000	357
2nd cl. Cr.	Diana	S. shd.	5600	350	0 54	0 21	0	2	9600	(Fairfield)	Fairfield	1895	249,332	3	2½	5 6-in. Q.F., 6 4·7-in.,‡ 1 12 pr., 11 smaller Q.F. and M.	3 (2 sub.)	19·5	550	470
„ „	Dido	S. shd.	5600	350	0 54	0 21	0	2	9600	Glasgow	London and Glasgow Co.	1896	252,278							
„ „	Doris	S. shd.	5600	350	0 54	0 21	0	2	9600	Barrow	Barrow	1896	254,029							
T. G. B.	Dryad	S.	1670	250	0 30	6 9	0	2	3500	Chatham	Maudslay	1893	73,491	2	..	2 4·7-in. Q.F., 4 6-pr.	3	19·0	100	120

x Includes Gun Mountings, &c. * Missing; officially announced lost on a voyage from Esquimalt to Honolulu. † Being re-engined and reboilered with small tube water-tube boilers. ‡ To be replaced by 6 in.

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft.	in.	ft.	in.	ft.	in.	no.					£	in.	in.			knots.	tons.	
1st cl. G. B.	Dwarf	S.	700	180	0	33	0	8	0	2	1300 Y	Glasgow	London and Glasgow Co.	1898	51,139	..	..	2 4-in. Q.F., 4 12-pr.	..	13.5	50	85
2nd cl. Cr.	Eclipse	S. shd.	5600	350	0	53	0	20	3	2	9600	Portsm'th	Portsm'th	1894	279,345	3	1½–3	11 6-in. Q.F. and 15 smaller, 4 M., 1 12-pr. boat.	3 (2 sub.)	19·5	550	477
1st cl. Cr.	Edgar	S.	7350	360	0	60	0	23	9	2	12,000	Devonp'rt	Fairfield	1890	401,083	6	5–1	2 9·2-in., 10 6-in. Q.F., 12 6-pr., 5 3-pr., 7 M., 2 l.	4 (2 sub.)	20·5	850	544
2nd cl. Cr.	Encounter	S.	5880	355	0	56	0	21	3	2	12,500 Durr	Devonp'rt	Keyham	Bldg.	398,971	..	..	11 6-in. and 15 small Q.F.	..	20·75 to 21·0	500	..
1st cl. Cr.	Endymion	S.	7350	360	0	60	0	23	9	2	12,000	Hull	Earle	1891	350,459	6	5–1	2 9·2-in., 10 6-in. Q.F., 12 6-pr., 5 3-pr., 7 M., 2 l.	4 (2 sub.)	20·5	850	544
Sloop	Egeria	C.	940	160	0	31	4	14	3	1	700	Pembroke	Humphrys	1873	42,882	..	..	4 20-pr., 2 M., 1 l.	..	11·3	100	122
,,	Espiègle	S. shd.	1070	185	0	33	0	11	3	2	1400 B & W	Sheerness	Wallsend Slipway Co.	Bldg.	76,509	..	..	6 4-in. Q.F., 4 3-pr.	..	13·5	160	160
1st cl. Cr.	Europa	S. shd.	11,000	435	0	69	0	26	0	2	16,500 B	Clydeb'nk	Thomson	1897	561,126	4½–2	4–2½	16 6-in. Q.F., 14 12-pr., 11 light Q.F. and M.	3 (2 sub.)	20·5	1000	357
Sloop	Fantôme	S. shd.	1070	185	0	33	0	11	3	2	1400 Nic.	Sheerness	Devonport	Bldg.	90,025	..	..	6 4-in. Q.F., 4 3-pr.	..	13·5	160	160
3rd cl. Cr.	Fearless	S.	1580	220	0	34	3	14	6	2	3200	Barrow	Barrow	1886 *x*	87,452	..	..	4 4·7-in. Q.F., 8 3-pr., 2 M., 1 l.	3 (1 sub.)	16·7	450	147
2nd cl. G. B.	Firebrand	C.	455	125	0	23	6	10	0	1	360	Glasgow	Thomson	1877	22,800	..	..	2 5-in., 2 4-in., 2 M.	..	10·17	40	61
2nd cl. Cr.	Flora	S. shd.	4360	320	0	49	6	19	0	2	9000	Pembroke	Barrow	1893	241,819							
,, ,,	Forte	S. shd.	4360	320	0	49	6	19	0	2	9000	Chatham	Chatham	1893	240,816	2	2–1	2 6-in. Q.F., 8 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	19·5	400	312
,, ,,	Fox	S. shd.	4360	320	0	49	6	19	0	2	9000	Portsm'th	Portsm'th	1893	244,078							
,, ,,	Forth	S.	4050	300	0	46	0	20	0	2	5700	Pembroke	Hawthorn	1886	201,952	2	3–2	2 8-in., 10 6-in. Q.F., 3 6-pr., 8 3-pr., 6 M., 2 l.	2	16·8	900	326

2nd cl. Cr.	Furious	S. shd.	5750	320	0 57	6 21	0	2	10,000 B	Devonp'rt	Earle	1896	280,772	3	1–2	10 6-in. Q.F., 9 12-pr., 3 3-pr., 1 12-pr. boat, 5 M.	2	19·0	500	480
,, ,,	Gladiator	S. shd.							10,000 B	Portsm'th	Maudslay	1896	287,642							
1st cl. Cr.	Gibraltar	S. shd.	7700	360	0 60	0 23	9	2	12,000	Glasgow	Napier	1892	347,634	6	5–1	2 9·2-in., 10 6-in. Q.F., 12 6-pr., 5 3-pr., 7 M., 2 l.	4 (2 sub.)	19·7	850	544
T. G. B.	Gleaner	S.	735	230	0 27	0 8	3	2	3600	Sheerness	Sheerness	1890	63,798	2	..	2 4·7-in. Q.F., 4 3-pr.	3	19·0	100	91
,,	Gossamer*	S.	735	230	0 27	0 8	3	2	3600	Sheerness	Sheerness	1890	54,490							
1st cl. G. B.	Goldfinch	C.	805	165	0 31	0 11	7½	1	1200	Sheerness	Sheerness	1889	40,889	..	..	6 4-in., 2 3-pr. Q.F., 2 M.	..	13·0	105	76
1st cl. Cr.	Grafton	S.	7350	360	0 60	0 23	9	2	12,000	Blackwall	Humphrys	1892	351,851	6	5–1	2 9·2-in., 10 6-in. Q.F., 12 6-pr., 5 3-pr., 7 M., 2 l.	4 (2 sub.)	20·0	850	560
T. G. B.	Grasshopper	S.	525	200	0 23	0 8	9	2	2700	Sheerness	Maudslay	1887	*x* 34,065	..	..	1 4-in., 6 3-pr. Q.F.	4	17·0	80	67
,,	Halcyon	S.	1070	250	0 30	6 9	0	2	3500	Devonp'rt	Hawthorn	1894	75,091	2		2 4·7-in. Q.F., 4 6-pr.	3	19·0	100	120
,,	Harrier	S.	1070	250	0 30	6 9	0	2	3500	Devonp'rt	Hawthorn	1894	73,428							
1st cl. Cr.	Hawke	S.	7350	360	0 60	0 23	9	2	12,000	Chatham	Fairfield	1891	365,491	6	5–1	2 9·2-in., 10 6-in. Q.F., 12 6-pr., 5 3-pr., 7 M., 2 l.	4 (2 sub.)	20·0	850	544
T. G. B.	Hazard	S.	1070	250	0 30	6 9	0	2	3500	Pembroke	Fairfield	1894	74,076	2		2 4·7-in. Q.F., 4 6-pr.	3	19·0	100	120
,,	Hebe	S.	810	230	0 27	0 8	9	2	3566	Sheerness	Sheerness	1892	73,433	2		2 4·7-in. Q.F., 4 3-pr.	3	19·25	100	91
T. D. S.	Hecla	I.	6400	391	7 38	9 24	3	1	2400	Belfast	Harland & Wolff	1878	126,190	..		4 7·5-in., 14 M.	4	13·0	2,200	277
2nd cl. Cr.	Hermes	S. shd.	5600	350	0 54	0 20	6	2	10,000 B.&W	Fairfield	Fairfield	1898	278,349	3	1½–3	11 6-in. Q.F., 15 smaller Q.F.	..	20·0	600	477
,, ,,	Highflyer	S. shd.	5600	350	0 54	0 20	6	2	10,000 B	Fairfield	,,	1898	278,186							
,, ,,	Hyacinth	S. shd.	5600	350	0 54	0 20	6	2	10,000 B	Glasgow	London and Glasgow Co.	1898	282,761							
,, ,,	Hermione	S. shd.	4360	320	0 49	6 19	0	2	9000	Devonp'rt	Thomson	1893	223,267	2	2–1	2 6-in. Q.F., 8 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	19·5	400	312

x Includes Gun Mountings, &c.

* Being re-engined and reboilered with small tube water-tube boilers.

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft.	in.	ft.	in.	ft.	in.	no.					£	in.	in.			knots.	tons.	
T. G. B. .	Hussar	S.	1070	250	0	30	6	9	0	2	3500	Devonp'rt	Hawthorn.	1894	72,886	2	..	2 4·7-in. Q.F., 4 6-pr.	3	19·0	100	120
Sloop	Icarus	C.	970	167	0	32	0	13	6	1	1200	Devonp'rt	Barrow	1885	*x* 52,104	..	..	8 5-in., 4 3-pr. Q.F., 4 M., 1 l.	..	12·2	150	126
2nd cl. Cr.	Indefatigable	S. shd.	3600	300	0	43	8	17	6	2	9000	Glasgow	London and Glasgow Co.	1891	181,024							
" "	Intrepid	S. shd.	3600	300	0	43	8	17	6	2	9000	Glasgow	London and Glasgow Co.	1891	181,157	2	2–1	2 6-in.Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	19·75	400	273
" "	Iphigenia	S shd.	3600	300	0	43	8	17	6	2	9000	Glasgow	London and Glasgow Co.	1891	181,879							
" "	Iris	S.	3730	300	0	46	0	22	0	2	6000	Pembroke	Maudslay	1877	213,186	..	..	13 5-in., 4 3-pr. Q.F., 8 M., 1 l.	3	18·0	780	450
" "	Isis	S. shd	5600	350	0	54	0	21	0	2	9600	Glasgow	London and Glasgow Co.	1896	252,067	3	2½	5 6-in. Q.F., 6 4·7-in., 9 12-pr., 11 lighter Q.F. and M.	4 (2 sub.)	20·0	550	470
" "	Juno	S. shd.	5600	350	0	54	0	21	0	2	9600	Barrow	Barrow	1895	254,097							
T. G. B. .	Jaseur	S.	810	230	0	27	0	8	9	2	3711	Barrow	Barrow	1892	48,238	2	..	2 4·7-in. Q.F., 4 3-pr.	3	19·25	100	91
"	Jason *	S.	810	230	0	27	0	8	9	2	3540	Barrow	Barrow	1892	49,253 *x*							
"	Karrakatta (Australia)	S.	735	230	0	27	0	8	3	2	3500	Elswick	Bellis	1890	47,619	2	..	2 4·7-in. Q.F., 4 3-pr.	3	20·0	100	91

3rd cl. Cr.	Katoomba (Australia)		2575	265	0 41	0 15	6	2	7500	Elswick	Hawthorn	1889	116,719	2	2–1	8 4·7-in. Q.F., 8 3-pr., 4 M., 1 l.	4	19·0	300	217
G. V.	Landrail	S.	950	195	0 28	0 10	6	2	1200	Devonp'rt	Penn	1886	49,963	..	..	1 6-in., 3 5-in., 4 3-pr. Q.F., 3 M.	..	14·5	250	46
1st cl. G. B.	Lapwing	C.	805	165	0 31	0 11	7½	2	1200	Devonp'rt	Devonport	1889	39,952	..	..	6 4-in. 25-cwt., 2 3-pr. Q.F., 2 M.	..	13·0	105	76
2nd cl. Cr.	Latona	S.	3400	300	0 43	0 16	6	2	9000	Barrow	Barrow	1890	171,068	2	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	20·0	400	273
T. G. B.	Leda	S.	810	230	0 27	0 8	9	2	3597	Sheerness	Penn	1892	62,145	2	..	2 4·7-in. Q.F., 4 3-pr.	3	19·25	100	91
G. V.	Linnet	C.	756	165	0 29	0 10	11	2	870	Blackwall	Rennie	1880	35,663	..	..	2 90-cwt. M.L.R., 4 6-pr. Q.F., 2 M.	..	11·80	180	92
1st cl. G. B.	Lizard	C.	715	165	0 29	0 11	10	1	1000	Belfast	Harland	1886	52,770	..	..	6 4-in., 4 M.	..	13·0	105	76
3rd cl. Crs.	Magicienne / Marathon	S. shd.	2950	265	0 42	0 17	6	2	9000	Glasgow (Fairfield)	Hawthorn	1888	136,000	..	1½	6 6-in. Q.F., 9 6-pr., 1 3-pr., 3 M., 1 l.	4	19·0	400	218
1st cl. G. B.	Magpie	C.	805	165	0 31	0 11	7½	1	1200	Pembroke	Earle	1889	x 38,700	..	..	6 4-in., 4 M.	..	13·0	105	76
3rd cl. Crs.	Medea / Medusa	S.	2800	265	0 41	0 16	6	2	9000 Y. / 9000 Dürr	Chatham	Humphrys	1888	x 141,700	..	1½	6 6-in. Q.F.C., 9 6-pr., 1 3-pr., 3 M., 1 l.	4	19·0	400	218
2nd cl. Cr.	Melampus	S.	3400	300	0 43	0 16	6	2	9000	Barrow	Barrow	1890	171,635	2	2–1	2 6-in. Q.F., 6 4·7 in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	20·0	400	273
Sloop	Melita	C.	970	167	0 32	0 13	6	1	1200	Malta	Malta Dock Yard	1888	60,179	..	..	8 5-in., 8 M., 1 l.	..	12·50	150	125
3rd cl. Cr.	Melpomene	S. shd.	2950	265	0 41	0 17	6	2	9000	Portsm'th	Palmer Co.	1888	x 142,000	..	1½	6 6-in. Q.F., 9 6-pr., 1 3-pr., 3 M., 1 l.	4	19·0	400	218
2nd cl. Cr.	Mercury	S.	3730	300	0 46	0 20	2	2	6000	Pembroke	Maudslay	1878	213,252	..	..	13 5-in., 12 light Q.F., and M.	4	16·8	780	291
Sloop	Merlin	S. shd.	1070	185	0 33	0 11	3	2	1400 B.	Sheerness	Devonport	1901	91,928	..	..	6 4-in. Q.F., 4 3-pr.	..	13·25	160	160

cludes Gun Mountings, &c.

* Being re-engined and reboilered with small tube water-tube boilers.

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					£	in.	in.			knots.	tons.	
2nd cl. Cr.	**Mersey**	S.	4050	300 0	46 0	19 6	2	6000	Chatham	Humphrys	1885	154,000	4	3–2	2 15-ton, 10 6-in. Q.F., 3 6-pr., 8 3-pr., 5 M., 2 l.	4	17·3	900	327
3rd cl. Cr.	**Mildura** (Australia)	S.	2575	265 0	41 0	15 6	2	7500	Elswick	Hawthorn	1889	116,062	2	2–1	8 4·7-in. Q.F., 8 3-pr., 4 M., 1 l.	4	19·0	300	217
2nd cl. Cr.	**Minerva**	S. shd.	5600	350 0	53 0	20 6	2	9600	Chatham	Chatham	1895	244,046	3	$1\frac{1}{2}$–3	11 6-in. Q.F., 9 12-pr., 11 smaller Q.F., and M.	3 (2 sub.)	20·3	550	437
3rd cl. Cr.	**Mohawk**	S.	1770	225 0	36 0	14 6	2	3500	Glasgow	Thomson	1886	x 87,583	..	..	6 6-in. Q.F., 8 3-pr., 2 M., 1 l.	3	16·5	475	172
Sloop	**Mutine**	S.	980	180 0	33 0	11 6	2	1400 B	Laird	Laird	1901	63,204	..	..	6 4-in. Q.F., 4 3-pr.	..	13·25	130	130
2nd cl. Cr.	**Naiad**	S.	3400	300 0	43 0	16 6	2	9000	Barrow	Barrow	1890	171,445	2	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	20·0	400	273
1st cl. Cr.	**Niobe**	S. shd.	11,000	435 0	69 0	25 0	2	16,500 * B	Barrow	Vickers	1897	552,692	$4\frac{1}{2}$–2	4–$2\frac{1}{2}$	16 6-in. Q.F., 14 12-pr., 11 light Q.F., and M.	3 (2 sub.)	20·5	1000	600
Sloop	**Nymphe**	C.	1140	195 0	28 0	12 6	1	2000	Portsm'th	Greenock F'ndry Co.	1888	x 57,600	..	..	8 5-in., 8 M.	..	14·0	160	138
T. G. B.	**Niger** *	S.	810	230 0	27 0	8 9	2	3784	Barrow	Barrow	1892	48,177	2	..	2 4·7-in. Q.F., 4 3-pr.	3	19·25	100	91
Sloop	**Odin**	S. shd.	1070	185 0	33 0	11 3	2	1400 B & W	Sheerness	Devonport	1901	82,767	..	..	6 4-in. Q.F., 4 3-pr.	..	13·25	160	160
T. G. B.	**Onyx**	S.	810	230 0	27 0	8 9	2	3548	Birkenh'd	Laird	1892	53,961	2	..	2 4·7-in, Q.F., 4 3-pr.	3	19·25	100	91
3rd cl. Cr.	**Pallas**	S.	2575	265 0	41 0	15 6	2	7610	Portsm'th	Hawthorn	1890	148,828	2	2–1	8 4·7-in. Q.F., 8 3-pr., 4 M., 1 l.	4	19·25	300	217
„ „	**Pearl**	S.	2575	265 0	41 0	15 6	2	7500	Pembroke	Earle	1888	151,693							
1st cl. G. B.	**Partridge**	C.	755	165 0	30 0	11 4	1	1200	Devonp'rt	Devonport	1888	37,800	..	..	6 4-in., 4 M.	..	13·25	105	76
„ ..	**Peacock**	C.	755	165 0	30 0	11 4	1	1200	Pembroke	Barrow Co.	1872	37,600							

3rd cl. Cr.	Pactolus	S.	2135	300	36	6 17	0	2	7000 Bl	Elswick	Penn	1897	139,736								
" "	Pandora	S.	2200	305	36	9 13	6	2	7000 T	Portsm'th	Portsm'th	1900	165,016								
" "	Pegasus	S.	2135	300	36	6 17	0	2	7000 R	Jarrow	Palmer	1897	135,071								
" "	Pelorus	S.	2135	300	36	6 17	0	2	7000 Nor.	Sheerness	Thomson	1896	161,840								
" "	Perseus	S.	2135	300	36	6 13	6	2	7000 T	Hull	Earle	1898	127,992								
" "	Pioneer	S.	2200	305	36	9 13	6	2	7000 T	Chatham	Fairfield	1899	149,080	·22	2	8 4-in., 8 3-pr. Q.F., 2 l.	2	20·0	250	224
" "	Pomone	S.	2135	300	36	6 13	6	2	7000 Bl	Sheerness	Penn	1897	149,568								
" "	Prometheus	S.	2135	300	36	6 13	6	2	7000 T	Hull	Earle	1898	127,975								
" "	Psyche	S.	2200	305	36	9 17	6	2	7000 T	Devonp'rt	Devonport	1898	155,563								
" "	Proserpine	S.	2135	300	36	6 17	0	2	7000 T	Sheerness	Devonport	1896	159,136								
" "	Pyramus	S.	2135	300	36	6 13	6	2	7000 R	Jarrow	Palmer	1898	135,096								
Sloop (Surveying)	Penguin	C.	1130	170	0 36	0 16	1	1	700	Glasgow	Hawthorn	1876	52,111	..	..	2 64-pr. M.L.R., 2 M., 1 l.	..	11·0	150	145
2nd cl. Cr.	Phaeton	S.	4300	300	0 46	0 20	6	2	5000	Glasgow	Napier	1883	145,198	..	$1\frac{1}{2}$	10 6-in. Q.F., 14 light Q.F., and M.	4	16·6	550 1000	309
1st cl. G. B.	Pheasant	C.	755	165	0 29	0 11	4	1	1200	Devonp'rt	Devonport	1888	x 37,800	..	..	6 4-in., 4 M.	..	13·25	105	76
3rd cl. Cr.	Philomel	S.	2575	265	0 41	0 15	6	2	7500	Devonp'rt	Earle	1890	156,102	2	2–1	8 4·7-in. Q.F., 8 3-pr., 4 M., 1 l.	2	19·0	300	217
" "	Phœbe	S.	2575	265	0 41	0 15	6	2	7500	Devonp'rt	Devonport	1890	161,154							
Sloop	Phœnix	S. shd.	1050	185	0 32	6 11	3	2	1400	Devonp'rt	Devonport	1895	63,930	·22	..	6 4-in. Q.F., 4 3-pr., 3 M.	..	13·0	160	106
1st cl. G. B.	Pigeon	C.	755	165	0 30	0 11	4	1	1200	Pembroke	Barrow	1888	x 37,800							
" "	Pigmy	C.	755	165	0 30	0 11	4	1	1200	Sheerness	Barrow	1888	37,700	..	..	6 4-in., 4 M.	..	13·25	105	76
" "	Plover	C.	755	165	0 30	0 11	4	1	1200	Pembroke	Barrow	1888	37,700							
2nd cl. Cr.	Pique	S. shd.	3600	300	0 43	8 17	6	2	9000	Jarrow	Palmer	1890	184,108	2	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	19·75	400	273
T. Ram	Polyphemus	S.	2640	240	0 40	0 20	0	2	5500	Chatham	Humphrys	1881	174,450	..	3–2	6 6-pr. Q.F., 2 M.	5	18·0	300	..

x Includes Gun Mountings, &c.

* Being re-engined and re-boilered with small tube water-tube boilers.

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					£	in.	in.			knots.	tons.	
3rd cl. Cr.	Porpoise	S.	1770	225 0	36 0	14 6	2	3500	Glasgow	Thomson	1886	87,583	..	..	6 6-in. Q.F.C., 8 3-pr., 2 M., 1 l.	3	16·5	475	172
1st cl. Cr.	Powerful	S. shd.	14,200	500 0	71 0	29 0	2	25,000 B	Barrow	Barrow	1895	674,879	6	3–6	2 9·2-in., 16 6-in. Q.F., 18 12-pr., 12 3-pr., 9 M., 2 12-pr. boat	4	22·1	1500*	840
3rd cl. Cr.	Pylades	C.	1420	200 0	38 0	15 9	1	1400	Sheerness	Laird	1884	62,000	..	1¼	14 5-in., 8 M., 1 l.	..	12·6	400	170
3rd cl. Cr.	Racoon	S.	1770	225 0	36 0	13 6	2	4500	Devonp'rt	Harland	1887	*x* 91,606	..	..	6 6-in. Q.F.C, 8 3-pr., 2 M., 1 l.	3	17·5	475	176
2nd cl. Cr.	Rainbow	S. shd.	3600	300 0	43 8	17 6	2	9681	Jarrow	Palmer	1891	184,086	2	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	19·7	400	273
2nd cl. G. Ves. (Surveying Service.)	Rambler	C.	835	157 0	29 6	13 7	1	650	Glasgow (Fairfield)	Elder	1880	37,038	..	..	2 20-pr., 1 M., 1 l.	..	10·66	40	160
1st cl. G. B.	Rattler	C.	715	165 0	29 0	11 0	1	1200	Elswick	Hawthorn	1886 *x*	38,734	..	..	6 4-in., 4 M.	..	13·6	105	76
T. G. B.	Rattlesnake	S.	550	200 0	23 0	8 0	2	2700	Birkenh'd	Laird	1886 *x*	35,425	..	..	1 4-in., 6 3-pr. Q.F.	4	18·5	100	67

2nd cl. G. B.	Raven	C.	465	125	0 23	6 10	0	1	360	Poplar	Rennie	1882	21,050	..	..	2 64-pr. M.L.R., 2 20-pr., 2 M.	..	9·5	40	
1st cl. G. B	Redbreast	C.	805	165	0 31	0 11	7½	1	1200	Pembroke	Earle	1888	38,700	..	..	6 4-in., 4 M.	..	13·0	105	76
,, ,,	Redpole																			
2nd cl. G. B.	Redwing	C.	461	125	0 23	6 10	0	1	360	Pembroke	Maudslay	1880	22,200	..	..	2 20-cwt., 2 M.	..	9·68	40	..
T. G. B.	Renard	S.	810	230	0 27	0 8	9	2	3500	Birkenh'd	Laird	1892	53,848	2	..	2 4·7 in. Q.F., 4 3-pr.	3	19·25	100	91
2nd cl. Cr.	Retribution	S. shd.	3600	300	0 43	8 17	6	2	9000	Jarrow	Palmer	1891	183,975	2	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	19·75	400	275
Sloop	Rinaldo	S.	980	180	0 33	0 11	6	2	1400 B	Laird	Laird	1891	63,774	..	..	6 4-in. Q.F., 4 3-pr.	..	13.25	130	130
3rd cl. Cr.	Ringarooma (Australia)	S.	2575	265	0 41	0 15	6	2	7500	Glasgow	Thomson	1890	128,076	2	2–1	8 4·7-in. Q.F., 8 3-pr. Q.F., 4 M., 1 l.	4	19·0	300	216
1st cl. G. B.	Ringdove	C.	805	165	0 31	5 11	7½	1	1200	Devonp'rt	Devonport	1889	39,753	..	..	6 4-in., 2 3-pr. Q.F., 2 M.	..	13·0	105	76
1st cl. Cr.	Royal Arthur	S. shd.	7700	360	0 60	0 27	9	2	12,000	Portsm'th	Maudslay	1891	402,414	6	5–1	1 9·2-in., 12 6-in. Q.F., 12 6-pr., 5 3-pr., 7 M., 2 l.	4 (2 sub.)	19·7	850	567
Sloop	Rosario	S. shd.	980	180	0 33	0 11	6	2	1400 B	Sheerness	Governm't	1898	77,962	..	..	6 4-in., 4 3-pr. Q.F.	..	13·25	130	130
3rd cl. Cr.	Royalist	C.	1420	200	0 38	0 15	9	1	1400	Devonp'rt	Maudslay	1883	68,173	..	1¼	2 6-in., 10 5-in., 4 M., 1 l.	..	12·6	400	171
1st cl. Cr.	St. George	S. shd.	7700	360	0 60	8 23	9	2	12,000	Hull	Maudslay	1892	377,204	6	5–1	2 9·2-in., 10 6-in. Q.F. 12 6-pr., 5 3-pr., 7 M. 2 l.	4 (2 sub.)	19·7	850	559
T. G. B.	Salamander	S.	735	230	0 27	0 8	3	2	3500 M.	Chatham	Maudslay	1889	57,911	2	..	2 4·7-in. Q.F., 4 3-pr. Q.F.	3	20·0	100	91
,, ,,	Sandfly	S.	525	200	0 23	0 8	9	2	2700	Devonp'rt	Maudslay	1887	x 36,167	·22	..	1 4-in., 6 3-pr. Q.F.	4	19·0	80	67

x Includes Gun Mountings, &c.

* Bunker capacity, 300.

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Cost.	Armour: Gun Position.	Armour: Deck.	Armament: Guns.	Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					£	in.	in.			knots.	tons.	
2nd cl. Cr.	**Sappho**	S.	3400	300 0	43 0	16 6	2	9861	Poplar	Penn	1891	171,853	2	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	20·47	400	273
,, ,,	**Scout**	S.	1580	220 0	34 0	14 6	2	3200	Glasgow	Thomson	1885	*x* 87,516	..	..	4 4·7-in. Q.F., 8 3-pr., 2 M., 1 l.	3 (1 sub.)	16·7	450	147
2nd cl. Cr.	**Scylla**	S.	3400	300 0	43 0	16 6	2	9280	Poplar	Penn	1892	171,593	2	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	20·62	400	273
T. G. B.	**Seagull**	S.	735	230 0	27 0	8 3	2	3500 Nic.	Chatham	Maudslay	1889	56,922 }	2	..	2 4·7-in., 4 3-pr. Q.F.	3	20·0	100	91
,, ,,	**Sharpshooter**	S.	735	230 0	27 0	8 3	2	3500 B	Devonp'rt	Bellis	1888	*x* 50,029 }							
Sloop	**Shearwater**	S. shd.	980	180 0	33 0	11 6	2	1400 B	Sheerness	Thames Co.	1901	65,400	..	..	6 4-in., 4 3-pr. Q.F.	..	13·25	130	130
T. G. B.	**Sheldrake**	S.	735	230 0	27 0	8 3	2	3500 B & W	Chatham	Maudslay	1889	57,800	2	..	2 4·7-in., 4 3-pr. Q.F.	3	20·0	100	91
,, ,,	**Skipjack***	S.	735	230 0	27 0	8 3	2	3500 R	Chatham	Laird	1889	59,531 }	2	..	2 4·7-in., 4 3-pr. Q.F.	3	20·0	100	91
,, ,,	**Spanker**	S.	735	230 0	27 0	8 3	2	3920 Du T.	Devonp'rt	Bellis	1889	50,000 }							
,, ,,	**Speedwell***	S.	735	230 0	27 0	8 3	2	3500	Devonp'rt	Laird	1889	52,000 }							
1st cl. Cr.	**Spartiate**	S. shd.	11,000	435 0	69 0	26 0	2	18,000	Pembroke	Maudslay	1898	636,141	4½–2	1–2½	16 6-in., 17 small Q.F., 2 12-pr. boat.	3 (2 sub.)	20·75	1000	600
2nd cl. Cr.	**Severn**	S.	4050	300 0	46 0	19 6	2	6000	Chatham	Humphrys	1885	*x* 212,621	4	3–2	2 8-in., 10 6-in. Q.F., 3 6-pr., 2 3-pr., 10 M., 2 l.	..	17·3	900	327

2nd cl. Cr.	Sirius	S. shd.	3600	300	0	43	8	17	6	2	9000	Elswick	Maudslay	1890	186,649	2	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 4 M., 1 l.	4	19·75	400	273
,, ,,	Spartan	S. shd.	3600	300	0	43	8	17	6	2	9000	Elswick	Maudslay	1891	186,351							
1st cl. G. B.	Sparrow	C.	805	165	0	31	0	11	7½	1	1200	Greenock	Greenock	1889	39,000	..	..	6 4-in., 2 3-pr. Q.F., 2 M.	..	13·0	105	76
T. G. B.	Speedy	S.	810	230	0	27	0	8	9	2	4703 T	Chiswick	Thornycrft	1893	58,927 x	2	..	2 4·7-in. Q.F., 4 3-pr.	3	20·21	100	91
,, ,,	Spider	S.	525	200	0	23	0	8	9	2	2700	Devonp'rt	Maudslay	1887	36,300	0·22	..	1 4-in, 6 3-pr. Q.F.	4	19·0	80	67
2nd cl. G. B.	Starling	C.	465	125	0	23	6	10	0	1	360	Poplar	Rennie	1882	21,100	..	..	2 64-pr. M.L.R., 2 20-pr., 2 M.	..	9·5	40	61
,, ,,	Stork	C.	465	125	0	23	6	10	0	1	360	Poplar	Rennie	1882	21,150	..	..	1 M., 2 l.	..	9·5	40	61
D. V.	Surprise	S.	1650	250	0	32	6	14	0	2	3000	Jarrow	Palmer	1885	x78,764	..	..	4 5-in., 4 6-pr. Q.F., 2 M.	..	17·0	400	114
Sloop	Swallow	C.	1130	195	0	28	0	11	6	2	1500	Sheerness	Rennie	1885	59,797	..	..	8 5-in., 8 M.	..	13·5	280	135
2nd cl. G. V.	Swift	C.	756	165	0	29	0	10	11	2	870	Blackwall	Rennie	1879	34,670	..	..	2 90-cwt. M.L.R., 4 6-pr. Q.F., 2 M.	..	11·81	180	92
2nd cl. Cr.	Talbot	S. shd.	5600	350	0	53	6	21	0	2	9600	Devonp'rt	Devonport	1895	273,856 x	3	1½–3	11 6-in. Q.F., 9 12-pr., 1 3-pr., 4 M., 1 l.	3 (2 sub.)	20·0	550	433
3rd cl. Cr.	Tartar	S.	1770	225	0	36	0	14	3½	2	3500	Glasgow	Thomson	1886	87,583	..	..	6 6-in. Q.F.C., 8 3-pr., 2 M., 1 l.	3	16·5	325	177
,, ,,	Tauranga (Australia)	S.	2575	265	0	41	0	15	6	2	7500	Glasgow	Thomson	1889	128,101	2	2–1	8 4·7-in. Q.F., 8 3-pr. Q.F., 4 M., 1 l.	4	19·0	300	212
2nd cl. Cr.	Terpsichore	S.	3400	300	0	43	0	16	6	2	9000	Glasgow	Thomson	1890	173,341	2	2–1	2 6-in. Q.F., 6 4·7-in., 8 6-pr., 1 3-pr., 9 M., 1 l.	4	20·0	400	275
1st cl. Cr.	Terrible	S. shd.	14,200	500	0	71	0	27	0	2	25,000 B	Glasgow	Thomson	1895	681,419	6	3–6	2 9·2-in., 16 6-in. Q.F., 18 12-pr., 12 3-pr., 9 M., 2 12-pr. boat.	4	22·4	3000	810
2nd cl. Cr.	Thames	S.	4050	300	0	46	0	19	6	2	5700	Pembroke	Penn	1885	205,452	4	3–2	2 8-in., 10 6-in. Q.F., 3 6-pr., 8 3-pr., 6 M., 2 l.	2	16·8	900	326
1st cl. G. B.	Thistle	S.	700	180	0	33	0	8	0	2	1300 Y	Glasgow	London and Glasgow Co.	1901	51,105	..	..	2 4-in. Q.F., 4 12-pr.	..	13·5	50	85
1st cl. Cr.	Theseus	S.	7350	360	0	60	0	23	9	2	12,000	Blackwall	Maudslay	1892	347,577	6	5–1	2 9·2-in., 10 6-in. Q.F., 12 6-pr., 5 3-pr., 7 M., 2 l.	4 (2 sub.)	20·0	850	544
2nd cl. Cr.	Thetis	S.	3400	300	0	43	0	16	6	2	9000	Glasgow	Thomson	1890	173,146	2	2–1	2 6-in., 6 4·7-in., 8 6-pr. Q.F., 1 3-pr., 4 M., 1 l.	4	20·0	400	273
,, ,,	Tribune	S.	3400	300	0	43	0	16	6	2	9000	Glasgow	Thomson	1891	173,006							

x Includes Gun Mountings, &c.

* Reboilered with small tube water-tube boilers.

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					£	in.	in.			knots.	tons.	
1st cl. G. B.	**Thrush**	C.	805	165 0	31 0	11 7½	1	1200	Greenock	Greenock F'ndry Co.	1889	39,000	..	..	6 4-in., 2 3-pr. Q.F., 2 M.	..	13·0	105	76
3rd cl. Cr.	**Topaze**	S.	3000	360 0	40 0	14 6	..	9800	..	..	Pro.	..	..	..	12 4-in., 8 3-pr.	..	21·75	300	..
Sloop	**Torch**	S. shd.	960	180 0	32 6	11 6	1	1400	Sheerness	Sheerness	1894	60,564	..	..	6 4-in. Q.F., 4 3-pr., 2 M.	..	13·25	130	101
2nd cl. Cr.	**Venus**	S. shd.	5600	350 0	54 0	21 2	2	9600	Fairfield	Fairfield	1895	249,938	3	2½	5 6-in. Q.F., 6 4·7-in.,* 9 12-pr., 7 3-pr., 4 M., 1 12-pr. boat	3 (2 sub.)	19·5	550	470
Sloop	**Vestal**	S. shd.	980	180 0	33 0	11 6	2	1400 B	Sheerness	Governm't	1901	94,301	..	..	6 4-in., 4 3-pr. Q.F.	..	13·25	130	130
2nd cl. Cr.	**Vindictive**	S.	5800	320 0	54 0	20 6	2	10,000 B	Chatham	Chatham	1896	290,458	3	1–2 N.S.	10 6-in. Q.F., 9 12-pr., 3 3-pr., 1 12-pr. boat, 5 M.	2	19·5	500	450
T. D. S.	**Vulcan**	S.	6620	350 0	58 0	23 0	2	12,032	Portsm'th	Humphrys	1889	370,447	2	5–2½	8 4·7-in. Q.F., 12 3-pr., 16 M., 1 l.	6 (2 sub.)	20·0	1000	433
3rd cl. Cr.	**Wallaroo** (Australia)	S.	2575	265 0	41 0	15 6	2	7500	Elswick	Hawthorn	1889	115,995	2	2–1	8 4·7-in. Q.F., 8 3-pr., 4 M., 1 l.	4	19·0	300	218
1st cl. G. B.	**Widgeon**	C.	805	165 0	30 0	11 7½	1	1200	Pembroke	Rennie	1889	39,315	..	..	6 4-in., 2 3-pr. Q.F., 2 M.	..	13·0	105	76
Scouts.	4 new ships. Programme 1902–03. Details not complete.																		

* To be replaced by 6 in.

River Gunboats.—Herald, Mosquito (1890), 82 tons Jackdaw, Heron, Robin, Nightingale, Snipe (1897), 85 tons; Woodcock, Woodlark (1897), 122 tons, 2 6-prs., 4 Maxims; Teal, Moorhen (1901), 180 tons, 2 6-prs., 13 knots; 4 recent boats in the Niger Protectorate. Recent Egyptian boats: Melik, Sultan, Sheik, 140 tons, 4 12-prs., 4 Maxims.

Royal Naval Reserved Merchant Cruisers.

—	Name.	Owners.	Length.	Breadth.	Draught of Water for the Admiralty List.	Gross Tonnage.	Indicated Horse-Power.	Ocean Speed.
			Feet.	Feet.	Feet.	Tons.		Knots.
Ships in receipt of an Annual subvention and permitted to fly the blue ensign.	Campania	Cunard Company	610	65	26	12,950	30,000	21
	Lucania	,, ,,	610	65	26	12,950	30,000	21
	Himalaya	Peninsular and Oriental Co.	465½	52	22½	6,898	10,000	17
	Australia	,, ,, ,,	465½	52	22½	6,901	10,000	17
	Victoria	,, ,, ,,	466	52	22½	6,091	7,000	16
	Arcadia	,, ,, ,,	466	52	22½	6,188	7,000	16
	Majestic 2 s.	White Star Company	565	58	24½	9,965	16,000	20
	Teutonic 2 s.	,, ,,	565	58	24½	9,984	16,000	20
	Empress of India 2 s.	Canadian Pacific Railway Co.	440	51	24½	5,905	10,000	16
	Empress of China 2 s.	,, ,, ,,	440	51	24½	5,905	10,000	16
	Empress of Japan 2 s.	,, ,, ,,	440	51	24½	5,905	10,000	16
Ships held at the disposition of the Admiralty without subsidy.	Etruria	Cunard Company	501½	57	26	8,120	14,500	19½
	Umbria	,, ,,	501½	57	26	8,128	14,500	19½
	Servia	,, ,,	515	52	26	7,392	10,000	16½
	Aurania	,, ,,	470	57	27	7,269	9,500	17
	Britannic	White Star Company	455	45	25	5,004	5,200	16
	Germanic	,, ,,	455	45	25	5,008	5,200	16
	Cymric	,, ,,	..	..	..	12,551	6,700	16
	Britannia	Peninsular and Oriental Co.	466	52	22½	6,525	7,000	16
	Oceana	,, ,, ,,	466	52	22½	6,188	6,000	16
	Peninsular	,, ,,	410½	48	..	5,287	4,972	15
	Oriental	,, ,,	410½	48	..	5,284	4,972	15
	Valetta	,, ,,	420½	45	22½	4,904	5,000	15
	Massilia	,, ,,	420½	45	22½	4,902	5,000	15
	Rome	,, ,, ,,	430	44½	22½	5,545	5,500	15
	Carthage	,, ,, ,,	430	44½	22½	4,879	5,000	15
	Ballarat	,, ,, ,,	420	43	22½	4,778	4,500	14
	Parramatta	,, ,, ,,	420	43	22½	4,756	4,500	14

There are also numerous ships on the Admiralty List complying with Admiralty conditions as to subdivision which have no national tie. They are suitable for receiving an armament, but there is no arrangement with Owners, except the promise of preference for occasional State employment.

GREAT BRITAIN, COLONIES, &c.—Cruising Ships, Gunboats, &c.

To what Government belonging.	Class of Ship.	Name.	Material of Construction.	Propellers.	Where Built.	When Launched.	Length.	Breadth.	Draught of Water.	Displacement.	Indicated Horse-Power.	Speed.	Coal Stowage.	Armament.
							ft. in.	ft. in.	ft. in.				tons.	
INDIA	T. G.B.	Assaye	Steel	2	Elswick	1891	230 0	27 0	8 3	735	3,500	19·0	100	2 4·7-in. Q.F., 4 3-pr. do., 1 f. tu. & 3 l. car.
	D. V.	Lawrence	Steel	Pad.	B'kenh'd	1886	212 2	32 2	18 3	1,154	1,277	13·5	270	Four 4-in. B.L.R., 4 6-pr. Q.F., 4 M.
	T. G. B.	Plassy	Steel	2	Elswick	1890	230 0	27 0	8 3	735	3,500	19·0	100	2 4·7-in. Q.F., 4 3-pr. do., 1 f. tu. & 3 l. car.
QUE'NSLAND.	Gun-vessel	Gayundah	Steel	2	Glasgow	1884	115 0	25 0	10 0	450	400	10·0	..	One 8-in. 11½-ton; one 6-in. 4-ton; one 3-pr. Q.F.; 2 M.
	Gun-vessel	Paluma	Steel	2	Glasgow	1884	115 0	25 0	10 0	450	340	10·0	..	One 8-in. 11½-ton; one 6-in. 4-ton; one 3-pr. Q.F.; 2 M.
SOUTH AUSTRALIA	Cruiser	Protector	Steel	2	..	1884	188 0	3 0	12 6	920	1,640	14·0	..	One 8-in. 11½-ton; five 6-in. 4-ton; five Gatlings.

The five second-class Cruisers, and the two Torpedo-Gunboats of the Australian Auxiliary Squadron are included in the list of Ships of the Royal Navy, as well as the armour-clads Abyssinia, Cerberus, and Magdala.

ARGENTINE REPUBLIC.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Battery. or Turret.	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.					£	inches.	inches.	inches.			knots.	tons.	
c.b.	Almirante Brown .	S.	4267	240 0	50 0	20 6	2	4500	Poplar .	1880	190,000	9 (cp.)	8 (cp.)	1½	10 5·9-in. Q.F. (Canet), 4 4·7 in., 8 2·4 in., 2 M.	2	13·75	650	350
c.d.s.t.	Andes † . . .	I.	1558	186 0	44 0	9 6	2	750	Birkenhead .	1875	85,600	6	9	1	2 11-in., 2 4·7-in., 4 M. . .	..	9·5	120	120
c.d.s.t.	Plata † . . .	I.	1558	186 0	44 0	9 6	2	750	Birkenhead .	1874	85,600								
a.c.	Garibaldi . .	S.	6840	328 0	59 8	24 0	2	13,384	Sestri Ponente	1895	681,240	6 H.S.	6 H.S.	1½	2 10-in., 10 6-in. Q.F., 6 4·7 in., 10 2·2 in., 10 1·4 in., 2 M.*	..	19·9 t	1000‡	500
a.c.	General Belgrano .	S.	7182	328 0	59 8	24 0	2	13,000	Leghorn .	1897	..	6 H.S.	6 H.S.	1½	2 10-in., 14 6-in. Q.F., 2 3-in., 10 2·2-in., 8 1·4-in., 2 L., 2 M.	4 sub.	20·1	1000	500
a.c.	General Mitra	S.	8500	..	..	..	..	17,000	Sestri Ponente	Pro.	..	..	..	..	.. ..	..	21·0	..	..
a.c.	General Roca .																		
c.d.s.b.	Independencia .	S.	2336	230 0	44 4	13 0	2	3000	Birkenhead .	1891	176,600	8 (cp.)	8 (cp.)	2	2 9·4-in., 4 4·7-in. Q.F., 4 3-pr., 4 M.	2	14·4	340	225
c.d.s.b.	Libertad . . .	S.	2336	230 0	44 4	13 0	2	3000	Birkenhead .	1890	176,600								
a.c.	Pueyrredon . .	S.	6882	328 0	59 8	24 0	2	13,000 B	Sestri Ponente	1898	..	6 H.S.	6 H.S.	1½	2 10-in., 10 6-in. Q.F., 6 4·7 in., 10 2·2-in., 10 1·4-in., 2 M.	4 sub.	20·1	1000	500
a.c.	San Martin . .	S.	6882	328 0	59 8	24 0	2	13,000	Leghorn .	1896	664,600	6 H.S.	6 H.S.	1½	4 8-in., 10 6-in. Q.F., 6 4·7, 12 2·2, & 10 1·4 in., 2 L., 2 M.*	4 sub.	19·0	1100	500

* Armament of Garibaldi, San Martin, General Belgrano and Pueyrredon, and Q.F. guns of Libertad and Independencia are Armstrong. † Andes and Plata to be reconstructed. ‡ Bunker capacity.

ARGENTINE REPUBLIC.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour.		Armament.		Speed.	Normal Coal Supply.	Complement.
															Gun Position.	Deck.	Guns.	Torpedo Tubes.			
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	inches.	inches.			knots.	tons.	
g.v.	Argentina	S.	820	192	0	27	0	13	0	1	850	Trieste	1883	25,500	..	..	1 6-in., 6 7-c.m. (K.), 4 M.	..	12·0	220	120
cr.	Buenos Aires	S. shd.	4780	396	0	47	2	19	0	2	17,000	Elswick	1895	383,000	4½	1–5	2 8-in. Q.F. (A.), 4 6-in. Q.F., 6 4·7-in. Q.F., 16 3-pr., 6 1-pr.	5	23·2*	1000†	429
to.g.b.	Espora	S.	520	210	0	25	0	8	0	2	3500	Birkenhead	1890	..	..	..	3 3-in. Q.F., 4 3-pr., 2 M.	5	20·0	100	124
cr.	Nueve de Julio	S.	3570	354	0	44	0	19	6	2	14,350	Elswick	1892	293,000	4½	4½	4 6-in. Q.F. (A.), 8 4·7-in., 12 3-pr., 12 1-pr.	5	22·74	770†	300
cr.	Patagonia	S. & W.	1442	220	0	32	10	12	9	2	2400	Trieste	1885	100,000	..	1½	1 10-in., 3 6-in., 6 l., 10 M.	..	13·0	350	210
to.g.b.	Patria	S.	1070	250	0	31	0	10	0	2	4500	Birkenhead	1893	87,000	..	..	2 4·7-in. Q.F., 4 8-pr., 2 3-pr., 2 M.	5	20·75	288	159
g.v.	Paraná	I.	550	142	8	25	0	11	9	1	475	Birkenhead	1874	..	..	..	2 6-in., 2 4·7-in.	..	11·0	..	..
cr.	25 de Mayo	S.	3200	325	0	43	0	16	0	2	13,800	Elswick	1890	260,000	4½	4½	2 8·2-in. (A.), 8 4·7-in. Q.F., 12 3-pr., 12 1-pr.	6	22·43	600†	185
g.v.	Uruguay	I.	550	142	8	25	0	11	9	1	475	Birkenhead	1874	..	..	..	2 6-in., 2 4·7-in.	..	11·0	..	..

* Natural draught. † Bunker capacity.

The training-ship (cruiser), Presidente Sarmiento, 2750 tons, 2000 I.H.P. (Niclausse boilers), and 13 knots speed, with 19 guns and three torpedo tubes; launched by Messrs. Laird, 1897. There are several other small gunboats; also the torpedo-ram Maipù (1063 tons, 1750 I.H.P.), built in England in 1880. The Florio Company sold to the Argentine Government the steamships Arno, Regina Margherita, and Sempione to be converted into cruisers; and the Spanish firm of Pinillos, Salny & Co., the Barcelona (4020 tons register), and Cadiz (4218 tons), which have been re-named Pampa and Gaucho.

AUSTRIA-HUNGARY.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position.	Armour. Deck Plating.	Armament. Guns.	Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.					£	inches.	inches.	inches.			knots.	tons.	
b.	"A." (Ersatz Laudon) / "B." (Ersatz Drache)	S.	10600	390	6	72	3	24	6	2	14,000 Y	Trieste	Bldg.	725,000	8¼–5	9–4	2	4 9·4-in., 8 7·5-in. Q.F., 6 6-in., 28 smaller.	..	19·0	..	..
c.d.s.b.	Arpad / Babenberg	S.	8340	354	3	65	8	23	4	2	11,000 B.	Trieste	1901 Bldg.	480,000	8·6 K.S.	8·2 K.S.	2½ H.S.	3 9·4-in., 12 5·9-in. Q.F., 24 smaller.	..	18·0	840	..
c.d.s.	Budapest	S.	5550	305	0	55	9	21	0	2	9185 B	Trieste	1896	349,600	10·6 H.S.	10·6 H.S.	2½ H.S.	4 9·4-in., 6 5·9-in. Q.F., 14 47-m.m. Q.F., 2 M.	4	17·8 t	500	..
c.b.	Custoza	I.	7060	302	3	58	0	24	6		4440	Trieste	1872	414,400	9	7	1½	8 10·2-in. (K.), 11 Q.F., 8 l.	2	14·0	584	567
c.b.	Don Juan de Austria	I.	3550	240	3	50	0	20	0	1	2700	Trieste	1875	..	8	6	1	8 8·2-in. (K.), 11 Q.F. & M., 6 l.	4	13·0	380	440
a. c.	"E." (Ersatz Radetzky)	S.	7400	383	10	61	8	21	4	2	12,300 Y	Pola	Bldg.	491,044	8¼–6½	8¼–5¼	1½	2 9·4-in., 5 7·5-in., 4 5·9-in. Q.F., 25 smaller.	..	21·0	..	..
c.d.s.	Erzherzog Albrecht	I.	5940	285	2	56	3	22	0	1	3600	Trieste	1872	357,600	9	7	1½	8 9·4-in. (K.), 11 Q.F., 8 l.	2	13·0	453	535
b.	Habsburg	S.	8340	354	3	65	8	23	4	2	11,000 B	Trieste	1900	..	8·6 H.S.	8·2 H.S.	2½ H.S.	3 9·4-in., 12 5·9-in. Q.F., 24 smaller.	..	18·0	840	..
a.c.	Kaiserin Maria Theresia	S.	5270	351	0	52	6	21	4	2	9755	Trieste	1893	304,187	4	4	2	2 9·4-in., 8 5·9-in. Q.F., 18 1·8 Q.F., 2 2·7-in., 2 M.	4	19·0	740	450
a.c.	Kaiser Karl VI.	S.	6250	367	6	56	0	20	4		12,800 B	Trieste	1898	368,124	10·6 H.S.	9·8 H.S.	1½ H.S.	2 9·4-in., 8 5·9-in. Q.F., 18 1·8, 2 M.	4	20·0	800	450
c.b.	Kaiser Max	I.	3566	240	3	50	0	20	0	1	2700	Trieste	1875	211,600	8	6	1	8 8·2-in. (K.), 11 Q.F. & M., 6 l.	4	13·0	380	440
Riv. Mon.	Körös	S.	448	177	0	29	6	4	0	2	1250	Buda Pesth	1892	..	2	3	¾	2 4·7-in. Q.F., 2 l., 1 M.		10·0	..	..
b.	Kronprinz Rudolph	S.	6940	295	0	62	4	25	3	2	7500	Pola	1887	330,000	12	10	2½	3 12-in. (K.), 6 4·7-in. Q.F., 11 smaller & M., 2 l.	4	16·0	600	492
b.	Kronprinzessin Stephanie	S.	5150	278	10	55	9	21	6	2	8300	Trieste	1887	300,000	9	8	1	2 12-in. (K.), 6 5·9-in., 11 Q.F. & M., 2 l.	4	17·0	400	510
Riv. Mon. / "	Leitha / Maros	I. & S.	310	166	0	27	6	3	7	2	320	Buda Pesth	1871	20,000	1·7	2	1	1 4 7-in. Q.F., 2 M.	..	8·0	20	54
c.d.s.	Monarch	S.	5550	305	0	55	9	21	0	2	8900	Pola	1895	339,062	10·6 H.S.	10·6 H.S.	2½ H.S.	4 9·4-in., 6 5·9-in. Q.F., 14 47-m.m. Q.F., 2 M.	4	17·4 t	500	..
c.b.	Prinz Eugen	I.	3566	240	6	50	0	20	0	1	2700	Pola	1877	..	8	6	1	8 8·2-in (K.), 11 Q.F. & M., 6 l.	4	13·0	380	440
Riv. Mon.	Szamos	S.	448	177	0	29	6	4	0	2	1250	Buda Pesth	1892	..	2	3	¾	2 4·7-in. Q.F., 2 Q.F., 1 M.	..	10·0		
c.b.	Tegetthoff	I. & S.	7390	286	11	71	1	24	10	2	8800	Trieste	1878 1893	..	14	14	3	6 9·4-in. (K.), 5 5·9-in. Q.F., 15 smaller do., 2 M.	4	16·3	670	578
c.d.s.	Wien	S.	5550	305	0	55	9	21	0	2	8480	Trieste	1895	337,850	10·6 H.S.	10·6 H.S.	2½ H.S.	4 9·4-in., 6 5·9 Q.F., 14 47-m.m. Q.F., 2 M.	4	17·6 t	500	..

Two monitors for the Danube and five patrol boats are to be laid down in 1902.

AUSTRIA-HUNGARY.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour.		Armament.		Speed.	Normal Coal Supply.	Complement.
															Gun Position.	Deck.	Guns.	Torpedo Tubes.			
			met.tns.	ft.	in.	ft.	in.	ft.	in.					£	in.	in.			knots.	tons.	
corr.	Aurora	C.	1370	190	6	32	10	16	1	1	1000	Trieste	1873	..	..	..	2 4·7-in. (Wahrendorf), 5 l., 2 M. or Q.F.	..	11·0	160	200
to. cr.	Aspern	S.	2400	301	10	39	6	14	2	2	7300 Y	Pola	1899	155,000	..	2	8 4·7-in. Q.F., 12 1·8-in.	1	20·0	..	..
to. g. b.	Blitz	S.	360	193	6	22	4	8	0	1	3500	Elbing	1888	..	..	..	9 Q.F.	..	21·0	250	61
cr. 3rd cl.	Donau	C.	2344	230	0	42	8	19	8	1	1800	Pola	1893	..	..	..	10 4·7-in. (Uchatius), 4 M., 1 l.	..	12·0	320	..
cr. 3rd cl.	Erzherzog Friedrich	W.	1590	173	10	39	5	16	9	1	800	Venice	1874	..	..	..	10 5·9-in. (Wahrendorf), 1 l.	..	9·0	200	261
cr.	Frundsberg	C.	1370	190	6	32	10	16	1	1	1000	Trieste	1873	..	..	..	2 5·9-in. (Wahrendorf), 5 l., 2 M. or Q.F.	..	11·0	160	209
cr. 2nd cl.	Kaiserin Elizabeth	S.	4064	321	6	47	6	18	7	2	9000	Pola	1890	..	3·5	2¼	2 9·4-in. (K.), 6 5·9-in. do., 11 Q.F., 2 l.	5	19·0	660	450
cr. 2nd cl.	Kaiser Franz Joseph I.	S.	4030	321	6	47	6	18	7	2	9000	Trieste	1889	..	3·5	2¼	2 9·4-in. (K.), 6 5·9-in. do., 11 Q.F., 2 l.	5	19·0	660	450
to. g. b.	Komet	S.	360	193	6	22	4	8	0	..	3500	Elbing	1888	..	..	..	9 Q.F.	..	21·0	..	61
cr. 2nd cl.	Laudon	C.	3430	253	0	46	0	20	8	1	2600	Trieste	1873	..	..	..	15 5·9-in. (K.), 7 Q.F. & M., 2 l.	..	13·0	450	497
cr. 3rd cl.	Leopard	S.	1530	224	0	34	0	14	0	2	6000	Elswick	1886	200,000	..	..	2 4·7-in. Q.F., 10 Q.F. & M.	4	18·3	250	148
to. g. b.	Lussin	S.	1011	200	4	26	3	12	2	2	1830 Dürr.	Trieste	1883	..	..	1½	2 5·9-in. (K.), 7 M., 1 l.	..	14·0	200	142

to. g. b.	**Magnet**	S.	510	219	10	26	10	8	0	2	6000 T	Elbing	1896	51,052	..	..	6 1-8-in. Q.F.	3	26·0 *t*	105	..
to. g. b.	**Meteor**	S.	350	187	0	22	4	8	0	2	3500	Elbing	1887	..	..	..	9 Q.F.	1	23.1	120	61
cr. 3rd cl.	**Panther**	S.	1530	224	0	34	0	14	0	2	6000	Elswick	1885	..	..	..	2 4·7-in. Q.F., 10 Q.F. & M.	4	18·5	250	148
to. deps.	**Pelican**	S.	2470	279	0	39	4	15	6	..	4600	Elbing	1891	..	..	..	2 5·9-in. (K.), 8 Q.F.	4	18·0	..	..
to. g. b.	**Planet**	S.	500	210	0	23	0	8	3	2	3500	Jarrow	1889	..	..	..	10 Q.F.	1	19·6	..	61
cr. 3rd cl.	**Saida**	C.	2500	233	4	42	8	19	1	1	1800	Pola	1878	..	..	..	11 5·9-in. (Uchatius), 1 l.	..	12·0	320	299
to. g. b.	**Satellit**	S.	540	220	6	26	9	9	2	2	4000	Elbing	1893	..	..	1½	9 Q.F.	..	21·87	..	61
to. g. b.	**Sebenico**	S.	900	187	0	26	3	12	2	2	1380	Pola	1882	..	..	..	7 Q.F., 5 l.	..	14·0	200	142
cr. 3rd cl.	**Spalato**	S.	850	179	6	26	3	12	2	2	1200	Trieste	1879	..	..	..	7 Q.F., 5 l.	..	14·0	150	142
to. cr.	**Szigètvâr**	S.	2350	301	10	39	6	14	2	2	7800 Y.	Pola	1899	155,000	..	2	8 4·7-in. Q.F., 12 1·8-in.	1	20·0	..	..
to. cr.	**Tiger**	S.	1675	233	0	32	10	15	5	2	5260	Trieste	1887	..	..	..	4 4·7-in., 10 Q.F.	..	18·0	300	190
to. g. b.	**Trabant**	S.	530	210	0	23	0	8	3	2	3500	Trieste	1890	..	..	..	10 Q.F.	1	20·0	..	61
to. v.	**Zara**	S.	850	179	6	26	3	12	2	2	1200	Pola	1879	..	..	..	7 Q.F., 5 l.	..	14·0	150	142
to. cr.	**Zenta**	S.	2300	301	10	39	6	14	2	2	7800 Y.	Trieste	1897	143,780	..	2	8 4·7 Q.F., 12 1·8-in., 2 M.	1	20·9 *t*	..	..
corv.	**Zrinyi**	C.	1370	190	6	32	10	16	1	1	1000	Trieste	1871	..	..	..	2 5·9-in. (Wahrendorf), 5 l., 2 M. or Q.F.	..	11.0	160	209

Four screw gunboats, between 540 and 870 tons displacement and 250 and 950 indicated horse-power.

BRAZIL.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour: Belt.	Armour: Gun Position.	Armour: Backing. Deck Plating.	Armament: Guns.	Armament: Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£	inches.	inches.	inches.			knots.	tons.	
t. River	**Alagoãs**	W.	340	120 0	28 0	4 10	2	180	Brazil	1886	..	4½	4½	14½	1 7-in. M.L.R. (Whitworth), 2 M.	..	7·0	..	43
c.d.s., t.	**Bahia**	I.	1000	178 0	35 0	8 6	2	1640	Birkenhead	1865	..	4½	5½	10⅝	2 7-in. M.L.R. (Whitworth), 2 M.	..	6·0	..	125
t. River	**Maranhao**	S.	470	137 0	34 7	6 5	2	700	Rio de Janeiro	1890	..	5 H.S.	..	..	2 4·7-in. Q.F., 1 2·5-in., 5 M.	..	12·0	..	..
c.d s., t. / *c.d.s., t.*	**Marshal Deodoro** / **Marshal Floriano**	S.	3162	267 6	48 0	13 2	2	3400	La Seyne D'A.	1898 / 1899	..	13¾ H.S.	7¾-8¾ H.S.	1½	2 9·4-in., 2 5·9-in. howitzers, 4 4·7-in. Q.F., 2 M., 4 6-pr. and 2 1-pr.	2 (sub.)	15·0	236	200
t. River	**Pará**	S.	470	137 0	34 7	6 5	2	700	Rio de Janeiro	1890	..	5 H.S.	..	..	2 4·7-in. Q.F., 1 2·5-in., 5 M.	..	12·0	..	..
t. River	**Piauhy**	W.	340	120 0	28 0	4 10	2	180	Brazil	1887	..	4½	4½	14½	1 7-in. M.L.R. (Whitworth)	..	7·0	..	43
t.	**Riachuelo**	S. shd.	5700	305 0	52 0	19 6	2	7300	Poplar	1883 1895	365,000*	11 comp.	11 & 10 comp.	10 2"	4 9·2-in. (Whitworth, altered by Armstrong), 6 4·7-in. Q.F., 2 3-pr., 15 M.	5	16·71	800	450
t. River	**Rio Grande**	W.	340	120 0	28 0	4 10	2	180	Brazil	1888	..	4½	4½	14½	1 7-in. M.L.R. (Whitworth)	..	7·0	..	43
t.	**24 de Maio** (ex **Aquidaban**)	S shd.	4950	280 0	52 0	18 0	2	6200	Poplar	1885 1897	345,000*	11	11½ & 10 cp.	10 2"	4 9·4-in. (Canet), 4 5·5-in., 2 Q.F., 13 M.	5	15·0	600	350

* Exclusive of guns and ammunition.

Floating batteries, Brazil (1518 tons) and Lima-Barros (1444 tons).

BRAZIL.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.*	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft.	in.	ft.	in.	ft.	in.	no.					inches.	inches.			knots.	tons.	
cr.	Almirante Tamandare .	S. shd.	4735	294	0	46	0	18	4	2	7500	Brazil .	1890	..	..	1½	10 6-in. Q.F., 2 4·7-in., 8 M. .	8	17·0	750	450
,,	Andrada (ex America)	S. shd.	2600	252	8	34	0	18	0	1	3600	Bergen .	1890	..	..	..	2 4·7-in. 2 14-pr. Q.F., 6 6-pr., 6 1-pr.	5	17·0	..	..
,,	Barroso	S. shd.	3600	330	0	43	9	16	10	2	7500	Elswick .	1896	..	4½	3	6 6-in. Q.F., 4 4·7-in., 10 6-pr., 4 1-pr., 4 M.	3	20·0	700	..
,,	Benjamin Constant .	S. shd.	2750	236	0	46	0	18	0	1	2800	La Seyne	1892	..	..	2	4 6-in. Q.F., 8 4·7-in., 8 M., 4 l..	4	14·0	260	287
to.cr.	Caramuru . . .	S.	1030	249	6	30	9	10	2	2	6000	Kiel .	1896	..	..	½	2 3·9-in. Q.F., 6 2·2-in., 2 1·4-in.	3	22·5	..	..
to.g.b.	Gustavo Sampaio .	S.W.	500	197	0	21	0	7	9	2	2500	Elswick .	1893	..	..	..	2 20-pr. Q.F., 4 7-pr. Q.F. . .	3	18·0	150	95
cr.	Parnahyba . . . (Torpedo training.)	C.	838	170	6	26	3	11	2	1	900	Havre .	1878	..	..	..	5 4·7-in., 4 M.	..	10·0	..	..
,,	Paysandu (ex Guanabára)	W.	1900	200	0	41	2	16	4	1	3000	Brazil .	1877	..	..	..	9 70-pr. M.L.R. (Whitworth), 6 M., 2 l.	..	13·0	..	250
cr.	Primeiro de Março .	C.	726	167	3	26	3	10	6	1	750	Brazil .	1881	..	..	..	7 4·5-in. M.L.R. (Whitworth), 4 M.	..	9·0	..	..
,,	Quinze de Novembro (ex Republica) . .	S.	1300	210	0	35	0	13	0	2	3300	Elswick .	1892	..	..	2–1	6 4·7-in. Q.F., 4 6-pr., 6 M. .	4	17·0	170	160
to.cr.	Tamoyo. . . .	S.	1080	269	0	28	10	9	10	2	6500	Kiel .	1898	..	..	..	2 3·9-in. Q.F., 6 2·2-in., 2 1·4-in., 2 M.	3	23·0	293	110
,,	Timbira. . . .	S.	1030	249	6	30	9	10	2	2	7000	Kiel .	1896	..	..	½	2 3·9-in. Q.F., 6 2·2-in.. 2 1·4-in., 2 M.	3	22·5	250	110
g.r.	Tiradentes . . .	S. shd.	800	165	0	30	0	11	0	2	1200	Elswick .	1892	..	..	..	4 4·7-in. Q.F., 3 6-pr., 4 M. .	2	14·5	110	107
cr.	Tonelero (ex Trajano) .	W.	1414	200	0	30	0	15	6	2	2400	Brazil	1873 / 1895	..	..	..	7 4·7-in. Q.F., 4 M.. . . .	..	13·0	..	..
,,	Trinidade (ex Liberdade)	I.	250	101	8	21	8	10	10	2	280	Brazil .	1884	..	..	..	2 l., 1 M.	..	10·0	..	..
to.cr.	Tupy . . .	S.	1030	249	6	30	9	10	2	2	7000	Kiel .	1896	..	..	½	2 3·9-in. Q.F., 6 2·2-in., 2 1·4-in., 2 M.	3	22·5	250	110

* All the Q.F. guns above 6-pr. in Brazilian Navy are Armstrong.

Ten screw gunboats, 200 tons to 400 tons, and eight paddle gunboats, 120 tons to 160 tons.

CHILI.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position.	Armour. Deck Plating.	Armament. Guns.	Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£	inches.	inches.	inches.			knots.	tons.	
c.b.	Almirante Cochrane	W.I. shd.	3500	210 0	45 9	19 8	2	2920	Hull .	. 1874	..	9	8	3"	6 8-in. (A.), 4 6-pr. Q.F., 4 3-pr., 7 M.	3	13·0	350	242
a.c.	Almirante O'Higgins	S. shd.	8500	411 9	62 6	22 0	2	16,000 B	Elswick	. 1897	..	7	6	2	4 8-in. Q.F., 10 6-in., 4 4·7-in , 10 12-pr., 10 6-pr., 4 M.	3 2 sub.	21·5 t.	1260	..
b.	Capitan Prat . .	S. shd.	6900	328 0	60 8	21 10	2	12,000	La Seyne	. 1890	391,000	12	10½ 4	3"	6 9·4-in. (Canet), 8 4·7-in. Q.F. (Canet), 6 2·2-in., 4 1·8-in., 10 1·4-in., 5 M.	4	18·3	775	485
a.c.	Esmeralda . .	S. shd.	7020	436 0	53 2	22 3	2	16,000	Elswick	. 1896	..	6 H.S.		2	2 8-in. Q.F., 16 6-in., 8 12-pr., 2 3-pr., 4 M.	3 2 sub.	22·8 t.	1350	..

The Huascar, 1800 tons, launched at Birkenhead in 1865, is now a floating battery. Two battleships have been ordered, from Elswick and Barrow.

Cruising Ships, &c.

Class	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Maximum Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					inches.	inches.			knots.	tons.	
to.g.b.	Almirante Condell / Almirante Lynch	S.	750	240 0	27 6	10 6	2	4500 B	Birkenhead .	1890	..	..	..	3 14-pr. Q.F., 4 3-pr., 2 M. . .	5	21·0	210	..
,,	Almirante Simpson	S.	812	240 0	27 6	10 6	2	4700 Nor.	Birkenhead .	1896	..	4½	..	2 4·7-in. Q.F., 4 3-pr. . . .	3	21·0t	200	..
cr.	Blanco Encalada .	S. shd.	4400	370 0	46 6	18 6	2	14,500	Elswick .	1893	..	..	4–1¾	2 8-in., 10 6-in. Q.F., 12 3-pr., 10 1-pr.*	5	22·78	†900	..
,,	Chacabuco . .	S. shd.	4500	360 0	46 0	18‡ 0	2	15,750	Elswick .	1901	..	..	4½–1¾	2 8-in., 10 4·7-in. Q.F., 16 1·8 in., 2 M., 1 l.	5	23·0	1000 †	..
,,	General Baquedano (Training)	S.	2330	240 0	45 9	18‡ 0	1	1500 B	Elswick .	1898	..	..	..	4 4·7-in. Q.F., 2 12-pr., 2 6-pr., 2 M., 1 l.	1	13·7	200 300	302
gr.	Magellanes .	C.	800	190 0	28 0	14 9	2	1230	London	1874	..	..	..	2 6-in., 1 7-in. M.L.R., 6 M., 2 l. .	..	11·0	300	100
cr.	Ministro Zenteno .	S. shd.	3600	330 3	43 9	16 10	2	6500	Elswick	1896	..	..	..	8 6-in. Q.F., 10 6-pr., 4 1-pr.* . .	3	20·0t	800	..
gr.	Pilcomayo . .	W.	790	171 0	27 4	..	1	180 (nom.)	Birkenhead .	1874	..	..	..	2 70-pr. B.L.R. (A.), 2 40-pr., 3 M. .	..	9·0	125	125
cr. / ,,	Presidente Errázuriz / Presidente Pinto .	S. shd.	2080	268 0	35 9	19 6	2	5400	La Seyne .	1890	..	..	3½	4 6-in. Q.F. (Canet), 2 5-in., 4 2·2-in., 6 M.	3	19·0	200	171

Two Gunboats of 145 tons displacement and one of 180 tons. * Armstrong. † Bunker capacity. ‡ Mean draught.

CHINA.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					inches.	inches			knots.	tons.	
cr.	Foo-Ching	S.	2500	253 0	36 2	18 0	2	2400	..	1893	..	4½	4–2	3 5-in. K., 4 M., 2 l.	..	16·0	..	..
to.g.b.	Fei-Ying	S.	850	257 2	28 6	12 6	2	4500 Y	Stettin	1895	..	2	..	2 4-in. Q.F., 6 3·4-in., 4 smaller.	3	21·8	75	90
cr.	Hai-Chi	S.	4300	396 0	46 8	18 6	2	17000	Elswick	1898	..	6	5	2 8-in. Q.F., 10 4·7-in., 12 3-pd., 4 1·4-in., 6 M.	5	24·0	300	374
,,	Hai-Shen									1898								
,,	Hai-Shew	S.	2950	314 8	41 0	16 0	2	8000	Vulcan Stettin	1897	..	2	3	3 6-in. K. Q.F., 8 4-in., 6 1·4-in. Hotchkiss, 6 M.	3 1 sub.	20·7 t	220 (500)	244
,,	Hai-Yung									1897								
,,	Hai-Tien	S.	4300	396 0	46 8	18 6	2	17000	Walker	1897	..	6	5	2 8-in. Q.F., 10 4·7-in., 12 3-pd.	5	24·1 t	300	374
,,	Hi-Ying	S.	2200	253 0	36 2	18 1	2	2400	..	1895	..	..	..	2 8-in. A., 8 4·7-in. Q.F., 4 M.	1	21·0	..	..
,,	Huang-Tái	C.	2110	260 0	36 0	20 0	1	1600	..	1886	..	..	..	3 7-in. K., 7 40-pr., 6 M.	2	15·0	360	300
,,	Kai-Chih	C.	2110	260 0	36 0	20 0	1	1600	..	1882	..	..	..	2 8·2-in., 6 5·9-in., 6 M., 5 l.	..	14·5	360	300
,,	Kien-Wei	C.	2110	260 0	36 0	20 0	1	1600	Foochow	1899	..	..	..	2 8·2-in., 6 5·9-in., 6 M., 5 l.	..	14·5	360	300
,,	King-Ching	C.	2100	250 0	36 0	20 0	1	2400	..	1886	..	..	..	3 7-in. K., 7 40-pr., 6 M.	2	14·5	360	300
to.g.b.	Kwang-Ting	C.	1000	235 0	27 6	11 4	2	3400	..	1890	..	..	1	3 4·7-in. Q.F., 4 M., 2 l.	4	16·0	..	120
cr.	Nan-Schuin	S.	2200	253 0	36 2	18 1	2	2400	Kiel	1884	..	..	..	2 8-in. A., 8 4·7-in. Q.F., 9 M.	1	14·5	600	250
,,	Nan-Thin	S.	2200	253 0	36 2	18 1	1	2400	Kiel	1883	..	..	..	2 8-in. A., 8 4·7-in. Q.F., 9 M.	1	15·0	600	250
,,	Pao-Min	S.	1480	213 0	36 0	14 0	1	2400	..	1884	..	..	..	2 6-in. A., 6 5-in., 2 l.	..	9·0	300	200
g.b.	Tien-Sing	W.	200	105 0	20 4	7 0	2	340	..	1875	..	3	..	1 7-in. K.	..	10·0	..	..
cr.	Unnamed	C.	2110	260 0	36 0	20 0	1	1600	Foochow	Bldg.	..	..	..	2 8·2-in., 6 5·9-in., 6 M., 5 l.	..	14·5	360	300

The displacement of German-built ships in metric tons.
Torpedo-gunboat Pei-Ting (349 tons), four gunboats of 411 tons, two of 300 tons, four of 215 tons (defence of Canton Roads), training vessel Tung-Chi, 1700 tons—all launched 1885–88.

DENMARK.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position.	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	inches.	inches.	inches.			knots.	tons.	
c.d.s., t.	**Gorm** . . .	I.	2344	231	0	40	0	14	0	2	1670	Copenhagen .	1870	104,000	7	8	..	2 10-in. (A.) M.L.R., 3 3·4-in. (K.), 4 M.	..	12·25	115	158
t.	**Helgoland** . .	I.	5347	257	6	59	2	18	8	2	4000	Copenhagen .	1878	275,000	12	10	**4**	1 12-in. (K.), 4 10·2-in., 5 4·7-in., 10 M.	4	12·0	230	350
c.d.s., t.	**Herluf Trolle** .	S.	3470	271	0	50	0	16	2	2	4200 T	Copenhagen .	1899	..	$7\frac{3}{4}$ H.S	6 H.S.	..	2 9·4-in., 4 5·9-in. Q.F., 10 2·2-in., 8 smaller.	3 sub.	16·0	..	..
b.	**Iver Hvitfeldt** .	S.	3260	242	0	49	6	18	0	2	5100	Copenhagen .	1886	200,000	12	8	**2**	2 10·2-in. (K.), 4 4·7-in., 12 M.	4	15·6	250	298
c.d.s., t.	**Lindormen**. .	I.	2076	216	0	39	5	13	9	2	1560	Copenhagen .	1868	93,000	5	5	..	2 9-in. (A.) M.L.R., 3 3·4-in. (K.), 4 M.	..	12·0	120	140
c.b.	**Odin*** . . .	I.	3083	237	0	50	0	15	6	1	2260	Copenhagen .	1872	147,000	8	8	..	4 10-in. (A.) M.L.R., 4 3·4-in. (K.), 7 M.	..	12·4	180	236
c.d.s., t.	**Olfert Fischer** .	S.	5470	271	0	59	2	18	8	2	4200	Copenhagen .	Bldg.	..	$7\frac{3}{4}$ H.S.	6 H.S.	..	2 9·4-in., 4 5·9-in. Q.F., 10 2·2-in., 8 smaller.	3 sub.	16·0	..	..
.	**Skjold** . .	S.	2150	226	6	38	0	13	5	2	2200 T	Copenhagen .	1896	..	9	$8-4\frac{1}{2}$	**2**	1 9·4-in., 3 4·7-in. (K.), 4 1·8-in. Q.F., 1 M.	4	13·0	..	..
T. S.	**Tordenskjold** * .	S.	2400	221	6	43	3	15	6	2	2600	Copenhagen .	1880	138,900	..	8	**4–2**	1 14-in. (K.), 4 4·7-in., 8 M.	4	14·0	170	220

* Being reconstructed.

Esbern Snare (torpedo school-ship), 530 tons, 2-in. belt.

DENMARK.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	inches.	inches.			knots.	tons.	
g. v.	**Absalon**	I.	527	150	0	26	0	10	2	1	500	Blackwall	1862	..	2½	2½	4 3·4-in. (K.), 4 M.	..	10·0	65	70
„	**Falster**	I.	356	111	0	28	10	7	6	2	510	Copenhagen	1873	33,000	..	..	1 10-in. (A.) M.L.R., 2 3·4-in. (K.), 2 M.	..	9·8	20	35
cr.	**Fyen**	S. shd.	2596	226	6	45	6	18	1	1	2700	Copenhagen	1882	170,000	..	1½	18 5·9-in. (K.), 8 M.	2	13·0	290	407
3rd cl. *cr.*	**Geiser**	S.	1280	257	6	27	6	11	4	2	3000 T	Copenhagen	1892	..	..	1½	2 4·7-in. Q.F., 4 3·4-in., 6 M.	4	17·1	..	..
„	**Heimdal**	S.	1280	257	6	27	6	11	4	2	3000	Copenhagen	1894	..	..	1½	2 4·7-in. Q.F., 4 3-pr., 6 M.	4	17·5	..	..
„	**Hekla**	S.	1280	233	0	32	10	11	2	2	3000	Copenhagen	1890	..	..	1½	2 6-in. Q.F., 4 2·2-in., 6 M.	4	17·0	..	..
g. v.	**Ingolf**	I.	870	192	0	28	0	12	6	1	600	Copenhagen	1876	44,000	..	..	2 5·9-in. (K.), 4 3·4-in., 2 M.	..	10·5	130	117
g. v.	**Möen***	I.	356	111	0	28	10	7	6	1	523	Copenhagen	1875	..	..	..	1 10-in. (A.) M.L.R., 2 3·4-in. (K.), 2 M.	..	9·2	20	35
corv.	**Saint Thomas**	W.	1572	224	0	33	0	17	0	1	1870	Copenhagen	1871	..	..	..	8 4·7-in. (K.), 6 M.	..	13·0	190	182
cr.	**Valkyrien**	S.	2900	268	0	43	6	18	0	2	5300	Copenhagen	1887 1896	..	..	2½	2 8·2-in. (K.), 6 5·9-in., 4 Q.F., 10 M.	5	17·0	450	300

* Sunk, without loss of life, during trials with high explosives, 1901.

Gunboats.—Five in number (*Lille Belt*, *Öresund*, *Store Belt*, *Grönsund*, *Guldborgsund*), of 150 to 240 tons. 200 to 400 I.H.P. The *Guldborgsund* is to receive new boilers, 1902. *Dagmar* (training-ship), corvette, 1200 tons; *Hjaelperen* (mining), 280 tons; *Sleipnir* (ice-breaker), 1260 tons, 3000 I.H.P.
The *Beskytteren*, torpedo transport, 389 tons, 600 I.H.P., B. & W. boilers. 3 1·8 in. Q.F., launched 1900.

FRANCE.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	inches.	inches.	inches.			knots.	tons.	
t.	A 11*	S.	14,865	431	10	79	7	27	6	3	17,475 W.T.	..	Pro.	1,421,708	11–8 n.s.	12	..	4 12-in., 18 6·4-in. Q.F., 26 1·8-in., 2 1·4-in.	5 2 sub.	18·0	905 1825	793
a.g.b.	Achéron	I. & S.	1721	181	0	40	4	11	10	2	1700	Cherbourg	1885 1900	100,000	8	8	2½	1 10·8-in., 3 3·9-in. Q.F., 2 1·8-in., 4 M.	..	13·0	100	101
a.c.	Amiral Aube	S.	10,014	453	0	66	3	21	7	3	20,500 B	St. Nazaire	Bldg.	973,440	6 n.s.	5–7¾	2	2 7·6-in., 8 6·4-in. Q.F., 4 3·9-in., 26 small Q.F. and M.	4 2 sub.	21·0	970 1590	615
b.	Amiral Baudin	I. & S.	11,911	321	6	69	10	26	2	2	8320	Brest	1883 1899	600,000	21½	16½	4	2 10·8-in., 4 6·4-in. Q.F., 8 5·5-in., 36 small Q.F. and M.	4	15·0	800	630
a.c.	Amiral Charner	S.	4792	348	0	46	0	19	2	2	8300 B	Rochefort	1893	353,200	3½	2	2	2 7·6-in., 6 5·5-in. Q.F., 14 small Q.F. and M.	5	18·2	413	375
b.	Amiral Duperré	I. & S.	11,209	311	0	66	11	26	9	2	8120	La Seyne	1879 1901	570,000	21½	15½	2¼	3 13·3-in., 4 6·4-in. Q.F., 1 5·5-in., 14 4-in., 42 small Q.F. and M.	4	14·22	850	664
a.c.	Amiral de Gueydon	S.	9517	459	0	63	8	24	7	3	20,200 Nic.	Lorient	1899	817,994	6–3¾ n.s.	8, 3¾ n.s.	2	2 7·6-in., 8 6·4-in. Q.F., 4 3·9-in., 16 1·8-in., 6 1·4-in.	2 sub.	21·0	1020 1600	610
a.c.	Amiral Pothuau	S.	5360	370	6	50	2	21	0	2	10,398 B	Havre	1895	384,000	3⅝–2	9½	3⅜	2 7·6-in., 10 5·5-in. Q.F., 16 1·8-in., 8 1·4-in.		19·2 *t*	538	461
t.	Amiral Tré-houart	S.	6629	293	2	58	4	23	2	2	8500 B	Lorient	1893	593,100	17¾	14½	4	2 12-in., 8 3·9-in. Q.F., 4 1·8-in. Q.F., 4 1·4-in., 8 M.	2	15·76 *t*	300	337
t.	Bouvet	S.	12,200	401	2	70	3	27	6	3	14,000 B	Lorient	1896	1,100,770	15¾–8 n.s.	14½ n.s.	3½ n.s.	2 12-in., 2 10·8-in., 8 5·5-in. Q.F., 8 3·9-in., 19 small Q.F. and M.	4 2 sub.	18·2 *t*	621	621
t.	Bouvines	S.	6610	293	9	58	3	23	3	2	8400 A'D	La Seyne	1892	594,640	17¾	14½	4	2 12-in., 8 3·9-in. Q.F., 4 1·8-in., 10 1·4-in. M.	2	16·05	300	323

* Programme, 1902. A 12, 13, and 14 are inserted *pro formâ* in order that contracts may be entered into and preparations made for laying them down in 1903.

t.	Brennus . .	S.	11,395	361	0 67	0 26	3	2	14,000 B	Lorient .	1891	991,767	$15\frac{3}{4}$ comp.	$15\frac{3}{4}$	$4\frac{3}{4}$	3 13·4-in., 10 6·4-in. Q.F., 26 small Q.F. and M.	4	17·1	800	696
a.c.	Bruix . .	S.	4754	365	3 46	0 19	10	2	9049 B	Rochefort .	1894	409,622	$3\frac{3}{4}$	$3\frac{3}{4}$	2	2 7·6-in., 6 5·5-in. Q.F., 4 2·5-in., 4 1·8-in., 4 1·4-in., M.	4	18·3 *t*	406	391
a.c.	C 14* . .	S.	12,550	480	7 70	2 27	0	3	27,500 W.T.	Lorient .	Bldg.	1,169,910	$6\frac{3}{4}$ H.S.	..	$2\frac{1}{2}$	4 7·6-in., 16 6·4-in. Q.F., 22 1·8-in., 2 1·4in.	5 (sub.)	22·0	1320 2100	728
t.	Caïman . .	I. & S.	7239	278	3 59	0 24	7	2	6000	Toulon .	1885	..	$19\frac{1}{2}$	$9\frac{3}{4}$	3	2 10·8-in., 6 3·9-in. Q.F., 10 1·8-in., 2 M., 4 1·4-in.	4	14·5	400	332
t.	Carnot . .	S.	12,008	382	2 70	6 27	3	2	16,300 *t* D'A	Toulon .	1894	1,070,088	$17\frac{3}{4}$ $10\frac{3}{4}$	$14\frac{1}{2}$	$2\frac{3}{4}$	2 12-in., 2 10·8-in., 8 5·5-in. Q.F., 4 2·5-in., 16 1·8-in., 10 1·4-in.	4 (2 sub.)	17·86 *t*	705	625
a.c.	Chanzy . .	S.	4933	348	0 46	0 19	2	2	8300 B	Bordeaux .	1894	360,000	$3\frac{3}{4}$	2	2	2 7·6-in., 6 5·5-in. Q.F., 4 2·5-in., 6 1·8-in., 6 1·4-in., M.	4	19·0	413	375
t.	Charlemagne .	S.	11,275	385	6 66	6 27	6	3	14,500 B	Brest . .	1895	1,096,432	$15\frac{3}{4}$	$15\frac{3}{4}$	$3\frac{1}{2}$	4 12-in., 10 5·5-in. Q.F., 8 3·9-in., 16 1·8-in., 10 1.4-in., 8 M.	4 (2 sub.)	18·1 *t*	680 1100	631
t.	Charles Martel.	S.	11,880	392	6 71	0 27	6	2	14,996 *t* D'A	Brest . .	1893	1,092,830	$17\frac{3}{4}$	$15\frac{3}{4}$	$3\frac{1}{2}$	2 12-in., 2 10·8-in., 8 5·5-in. Q.F., 4 2·5-in., 14 1·8-in., 5 1·4-in.	6	18·1 *t*	677	632
a.g.b.	Cocyte . .	I. & S.	1714	181	10 40	4 11	10	2	1700	Cherbourg .	1887	100,000	8	8	$2\frac{1}{2}$	1 10·8-in., 2 3·9-in. Q.F., 2 1·8-in., 4 M.	..	13·0	100	101
a.c.	Condé . .	S.	10,014	453	0 63	9 24	7	3	20,500 Nic.	Lorient .	1902	863,799	6–5 H.S.	8, 5 H.S.	2	2 7·6-in., 8 6·4-in. Q.F., 6 3·9-in., 16 1·8-in., 6 1·4-in.	5 (2 sub.)	21·0	970 1590	615
c.b.&b.	Courbet .	I. & S.	10,808	312	0 67	0 25	0	2	8100† B.	Toulon .	1881 1899	800,000	15	$9\frac{1}{2}$	$2\frac{1}{2}$	4 10·8-in., 3 9·4-in., 1 6·4-in., 10 3·9-in. Q.F., 14 1·8-in., 17 1·4-in.	5	15·4	1000	669
a.c.	Desaix . .	S. shd.	7700	426	6 58	4 24	4	3	17,100 B	St. Nazaire .	1901	762,759	$4\frac{1}{2}$	$3\frac{1}{2}$	$2\frac{3}{4}$	8 6·4-in. Q.F., 4 3·9-in., 10 1·8-in., 4 1·4-in.	2	21·0	880 1200	531
c.b.&b.	Dévastation .	I. & S.	10,704	312	0 67	0 25	0	2	8320 B.	Lorient .	1879 1901	..	15	$9\frac{1}{2}$	$2\frac{1}{2}$	4 10·8-in., 2 9·4-in., 14 3·9-in. Q.F., 24 smaller Q.F., 14 M.	4	15·17	950	685
a.c.b.	Duguesclin . .	I. shd.	6210	266	0 57	0 25	3	2	3300	Rochefort .	1883	220,000	9	8 *comp.*	2	4 9·4-in., 1 7·6-in., 6 5·5-in., 1 3·5-in. Q.F., 10 M.	2	14·0	400	430
a.c.	DupetitThouars	S.	9517	452	9 63	8 24	7	3	19,600 B	Toulon .	1901	831,839	6–$3\frac{3}{4}$ H.S.	8, $3\frac{3}{4}$ H.S.	2	2 7·6-in., 8 6·4-in. Q.F., 4 3·9-in., 16 1·8-in., 6 1·4-in.	(2 sub.)	21·0	‡ 1020 1600	610

* C 15 Proposed—estimates of 1902. † Has received new boilers. ‡ Including liquid fuel

FRANCE.—Armoured Ships—*continued.*

Class.	NAME	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position.	Armour. Deck Plating	Armament. Guns.	Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	inches.	inches.	inches.			knots.	tons.	
a c.	Dupleix	S. shd.	7700	426	6	58	4	24	4	3	17,100 B	Rochefort	1900	652,354	4½	3½	2¾	8 6·4-in. Q.F., 10 1·8-in., 6 1·4-in.	2	21·0	880 1200	531
”	Dupuy de Lôme	S.	6406	374	0	51	6	23	6	3	14,000	Brest	1890	416,000	4	4	2	2 7·6-in., 6 6·4-in. Q.F., 12 2·5-in. and 1·8-in., 8 M.	4	20·0	900	515
a.g.b	Flamme	S.	1128	165	0	32	7	10	4	2	1500	Cherbourg	1885	68,000	10	4	2	1 9·4-in., 1 3·5-in., 4 M.	1	13·0	120	84
b.	Formidable	S.	12,165	321	6	69	6	26	2	2	9700*	Lorient	1885 1899	467,520	21½	17¾	3	2 10·8-in., 4 6·4-in. Q.F., 8 5·5-in., 36 smaller.	6	16·0	900	640
c.b. & b.	Friedland	I.	8994	317	0	58	0	29	11	1	4428	Lorient	1873	..	8	7	..	8 10·8-in., 8 5·5-in., 20 M.	4	13·3	800	676
c.d.s.,t.	Fulminant	I. & S.	5965	248	0	57	9	21	4	1	4500	Cherbourg	1877	..	13	12	2	2 10·8-in., 4 1·8-in. Q.F., 6 M.	2	13·8	400	248
c.d.s., b.	Furieux†	I. & S.	6019	247	10	59	0	21	9	2	5033 Nic.	Cherbourg	1883 1901	264,640	20	17¾	3½	2 9·4-in., 5 Q.F., 10 M.**	2	14·0	290	248
a.g.b.	Fusée	S. shd.	1142	165	0	32	7	10	4	2	1500	Lorient	1884	68,000	10	4	2	1 9·4-in., 1 3·5-in., 4 M.	1	13·0	120	84
t.	Gaulois	S.	11,275	385	6	66	6	27	6	3	14,500 B	Brest	1896	1,093,925	15¾	15¾	3½–1½	4 12-in., 10 5·5-in. Q.F., 8 3·9-in., 16 1·8-in., 10 1·4-in., 8 M.	6 (2 sub.)	18·0	680 1100	632
a.c.	Gloire	S.	10,014	453	0	63	9	24	7	3	20,500 Nor.	Lorient	1900	883,269	6–5 n.s.	8, 5 n.s.	2	2 7·6-in., 8 6·4-in. Q.F., 6 3·9-in., 16 1·8 in., 6 1·4 in.	5 (2 sub.)	21·0	970 1590	615
a.g.b.	Grenade	S. shd.	1089	165	0	32	7	10	4	2	1500	Lorient	1888	68,000	10	4	2	1 9·4-in., 1 3·5-in., 4 M.	1	13·0	120	84
t.	Henri IV.	S.	8948	354	4	72	3	22	11	3	11,500 Nic.	Cherbourg	1899	801,248	11–4¾ n.s.	11¾ n.s.	3	2 10·8-in., 7 5·5-in. Q.F., 12 1·8-in., 2 M.	2 (sub.)	17	725 1100	464
t .& b.	Hoche	I.&S.	10,997	333	0	65	7	27	3	2	11,300 B	Lorient	1886 1900	700,000	18	16	3	2 13·4-in., 2 10·8-in., 12 5·5-in. Q.F., 4 2·5-in., 9 1·8-in., 12 1·4-in., 8 M.	5	16·0	800	660
t.	Iéna	S.	12,052	400	9	68	2	27	6	3	16,500 *t* B	Brest	1898	1,111,340	13¾–4¾ n.s.	..	2½	4 12-in., 8 6·4-in. Q.F., 8 3·9-in., 16 1·8-in., 5 1·4-in., 13 1·4-in. M.	4 (2 sub.)	18·2 *t*	820 1100	631

t.	**Indomptable**	I.&S.	7583	279	10	59	0	23	6	2	6605 Nic.	Lorient	1883 1900	..	20	$9\frac{3}{4}$	3	2	10·8-in., 6 3·9-in. Q.F., 10 1·8-in., 4 1·4-in., 2 M.	4	14·8	400	332
t.	**Jauréguiberry**	S.	11,824	364	0	72	10	27	9	2	15,800 D'A.	La Seyne	1893	1,069,536	$17\frac{3}{4}$	$14\frac{1}{2}$	$2\frac{3}{4}$	2	12-in., 2 10·8-in., 8 5·5-in. Q.F., 4 2·5-in., 12 1·8-in., 8 1·4-in., 8 M.	6	18·07	700	625
a.c.	**Jeanne d'Arc**	S.	11,329	477	2	63	8	26	7	3	28,000 Guyot	Toulon	1899	875,847	6–3 n.s.	6 n.s.	2·2 n.s.	2	7·6-in., 8 5·5-in. Q.F., 10 3·9-in., 16 1·8-in., 8 1·4-in., 2 M.	2 (sub.)	23	1400 2100	626
c.d.s., t.	**Jemmapes**	S.	6592	284	0	57	8	22	0	2	9250 D'A.	St. Nazaire	1892	525,000	$17\frac{3}{4}$–10	$17\frac{3}{4}$	4–$2\frac{3}{4}$	2	13·4-in., 4 3·9-in. Q.F., 4 1·8-in. Q.F., 10 1·4-in. M.	2	16·7	300	334
a.c.	**Jules Ferry**	S.	12,550	480	7	70	2	27	0	3	24,000 Guyot	Cherbourg	Bldg.	1,169,940	6 n.s.	5–$7\frac{3}{4}$	2	4	7·6-in., 16 6·4-in. Q.F., 20 1·8-in., 4 1·4-in.	5 (2 sub.)	21·0	1320 2100	728
a.c.	**Kléber**	S. shd.	7700	426	6	58	4	24	4	3	18,000 Nic.	Bordeaux	Bldg.	770,320	$4\frac{1}{2}$	$3\frac{1}{2}$	$2\frac{3}{4}$	8	6·4-in. Q.F., 10 1·8-in., 6 1·4-in.	2	21·0	880 1200	531
a.c.	**Latouche-Tréville**	S.	4756	348	0	46	0	19	2	2	8300 B	Havre	1892	360,000	$3\frac{5}{8}$	$3\frac{3}{4}$	2–$1\frac{1}{2}$	2	7·6-in., 6 5·5-in. Q.F., 4 2·5-in., 4 1·8-in., 6 1·4-in. M.	4	18·2	406	375
a.c.	**Léon Gambetta**	S.	12,550	480	7	70	2	27	0	3	24,000 Nic.	Brest	1901	1,169,940	5–$7\frac{3}{4}$ n.s.	8–5	2	4	7·6-in., 16 6·4-in. Q.F., 20 1·8-in., 4 1·4-in.	5 (2 sub.)	22·0	1320 2100	728
b.	**Magenta**	I.&S.	10,851	330	0	65	7	27	3	2	12,000	Toulon	1890 1901	760,960	18	16	3	4	13·4-in., 17 5·5-in. Q.F., 4 2·5-in., 12 1·8-in., 8 M.	3	16·25	800	660
b.	**Marceau**	I.&S.	10,850	330	0	65	7	27	3	2	14,000 Nic.	La Seyne	1887 1901	769,080	18	16	3	4	13·4-in., 17 5·5-in. Q.F., 4 2·5-in. and 12 1·8-in., 8 M.	6	16·4	800	660
a.c.	**Marseillaise**	S.	10,014	453	0	63	9	24	7	3	20,500 B.	Brest	Bldg.	881,270	6 n.s.	5–$7\frac{3}{4}$	2	2	7·6-in., 8 6·4-in. Q.F., 6 3·9-in., 2 2·5-in., 18 1·8-in., 6 1·4-in.	4 (2 sub.)	21·0	970 1590	615
t.	**Masséna**	S.	11,924	384	10	66	0	27	0	3	13,500 D'A.	St. Nazaire	1895	1,100,400	$17\frac{3}{4}$–$9\frac{3}{4}$	$15\frac{1}{4}$ $15\frac{3}{4}$ n. s.	$3\frac{1}{2}$ n. s.	2	12-in., 2 10·8-in., 8 5·5-in. Q.F., 8 3·9-in., 12 1·8-in. and 12 1·4-in.	6 (2 sub.)	17·1 †	630	642
a.g.b.	**Mitraille**	S. shd.	1128	165	0	32	7	10	4	2	1500	Rochefort	1886	70,000	10	4	2	1	9·4-in., 1 3·5-in., 4 M.	..	13·0	120 ‡	84
a.c.	**Montcalm**	S.	9517	452	9	63	8	21	7	3	19,600 N. S.	La Seyne	1900	902,809	6–$3\frac{3}{4}$ n.s.	8, $3\frac{3}{4}$ n.s.	2	2	7·6-in., 8 6·4-in. Q.F., 4 3·9-in., 16 1·8-in., 6 1·4.-in.	2 (sub.)	21·0	1020 1600	612
b.	**Neptune**	I. & S.	10,983	330	0	65	7	27	3	2	12,000 B	Brest	1887 1901	780,000	18	16	3	4	13·4-in., 17 5·5-in. Q.F., 4 2·5-in. and 12 1·8-in., 8 M.	5	16·02	800	660
c.d.s.	**Onondaga**	I.	2593	226	6	49	3	16	0	2	642	New York	1863	..	$5\frac{1}{2}$	$11\frac{3}{4}$	1	4	9·4-in., 4 M.	..	6·5	200	100
t.	**Patrie**	S.	14,865	431	10	79	7	27	6	3	17,475 W.T.	La Seyne	Bldg.	1,421,708	11–7 n.s.	12	$2\frac{3}{4}$	4	12-in., 18 6·4-in. Q.F., 26 1·8-in., 2 1·4-in.	5 (2 sub.)	18.0	905 1825	793
a.g.b.	**Phlégéton**	I. & S.	1796	187	0	40	4	11	10	2	1700	Cherbourg	1890	142,000	9	8	2	1	10·8-in., 1 5·5-in. Q.F., 4 1·8-in., 4 M.		12·4	72	101
c.b. & b.	**Redoutable**	I. & S.	9437	318	2	64	8	25	6	2	6071	Lorient	1876 1896	..	14	$9\frac{1}{2}$	$2\frac{1}{2}$	8	9·4-in., 6 3·9-in. Q.F., 2 Q.F., 12 M.	4	14·66	1000	700

* Has received new boilers.

† Reconstruction of Furieux is in progress at Cherbourg.

‡ Including liquid fuel.

FRANCE.—Armoured Ships—*continued*.

Class.	NAME.	Material.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position.	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in	ft. in.	no.				£	inches.	inches.	inches.			knots.	tons.	
t.	**République**	S.	14,865	434 10	79 7	27 6	3	17,475 W.T.	Brest	Bldg.	1,421,708	11–7 H.S.	12	2¾	4 12-in., 18 6·4-in. Q.F., 26 1·8-in., 2 1·4-in.	5 (2 sub.)	18 0	905 1825	793
b.	**Requin**	I. & S.	7822	279 10	59 0	24 7	2	7000 Nic.	Bordeaux	1885 1900	..	19½	9¾	3	2 10·8-in., 6 3·9-in. Q.F., 10 1·8-in., 4 1·4-in., 12 M.	4	15·0	400	332
t.	**Saint Louis**	S.	11,275	385 6	66 6	27 6	3	14,500 B	Lorient	1896	1,080,997	15¾ H.S.	3–15¾ H.S.	3½	4 12-in., 10 5·5-in. Q.F., 8 3·9-in., 16 1·8-in., 10 1·4-in., 8 M.	4 (2 sub.)	18·0	820 1150	631
a.g.b.	**Styx**	I. & S.	1796	187 0	40 4	11 10	2	1700	Cherbourg	1892	142,000	9	8	2	1 10·8-in., 1 5·5-in. Q.F., 4 1·8-in., 4 M.	..	13·0	72	101
t.	**Suffren**	S.	12,728	411 9	70 4	27 6	3	16,500 Nic.	Brest	1899	1,195,564	11¾–5 H.S.	..	2¾	4 12-in., 10 6·4-in. Q.F., 8 3·9-in., 20 1·8-in.	4 (2 sub.)	18·0	1100 1820	..
a.c.	**Sully**	S	10,014	453 0	63 9	24 7	3	20,000 B.	La Seyne	1901	954,536	6–5 H.S.	8, 5 H.S.	2	2 7·6-in., 8 6·4-in. Q.F., 6 3·9-in., 16 1·8-in., 6 1·4-in.	5 (2 sub.)	21·0	..	..
c.d.s., t.	**Tempête**	I. & S.	4869	248 0	57 9	16 9	1	2193	Brest	1876	..	13	12	2	2 10·8-in., 4 1·8-in. Q.F., 6 M.	2	11·7	200	197
b.	**Terrible**	I. & S.	7575	279 10	59 0	24 7	2	6230	Brest	1881 1899	..	19½	17¾	3	2 10·8-in., 6 3·9-in. Q.F., 10 1·8-in., 4 1·4-in.	4	14·5	400	332
c.d.s., b.	**Tonnant**	I. & S.	5091	248 7	58 5	17 3	1	1935	Rochefort	1880	..	18	14½	3	2 13·4-in., 8 M.	..	11 5	200	197
c.d.s., t.	**Tonnerre**	I. & S.	5858	248 0	57 9	21 4	1	4165	Toulon	1875	..	13	12	2	2 10·8-in., 4 1·8-in. Q.F., 6 M.	2	14·01	400	249
c.d.s., t.	**Valmy**	S.	6592	293 9	57 4	23 3	2	8954	St. Nazaire	1892	578,957	17¾	17¾	4	2 13·4-in., 4 3·9-in. Q.F., 4 1·8-in., 10 M.	2	16·7	300	297
a.c.	**Vauban**	I.	6208	267 9	57 3	24 0	2	4560	Cherbourg	1882	..	10	8	2	4 9·4-in., 1 7·6-in., 6 5·5-in., 12 M.	2	14·32	550	440
c.d.s., t.	**Vengeur**	I. & S.	4709	248 0	57 9	16 9	2	2030	Cherbourg	1878	..	13	12	2	2 12·5-in., 4 1·8-in. Q.F., 6 M.	2	10·83	200	107
a.c.	**Victor Hugo**	S.	12,550	480 7	70 2	27 0	3	27,500 W.T.	Toulon	Bldg.	1,169,940	5–7¾ H.S.	8–5	2	4 7·6-in., 16 6·4-in. Q.F., 22 1·8-in., 2 1·4 in.	5 (2 sub.)	22·0	1320 2100	728

FRANCE.—Cruising Ships, &c.

Class.	NAME.	Material.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	in.	in.			knots.	tons.	
2nd cl. *cr.*	Alger	S.	4382	346	0	45	3	19	6	2	8254 B	Cherbourg	1889	280,000	..	3½	4 6·4-in. Q.F., 6 5·5-in., 10 other Q.F., 10 M.	4	19·61	860	325
g. v.	Aspic	C.	476	145	4	23	10	10	6	1	453	Rochefort	1880	..	..	..	2 5·5-in., 2 3·9-in.	..	10·3	50	80
to. g. b.	Bombe	S.	420	196	10	21	7	5	11	2	2000 D'A.	Havre	1885	..	..	..	4 1·8-in. Q.F., 3 M.	2	18·0	100	63
2nd cl. *cr.*	Bugeaud	S.	3740	308	6	43	6	20	6	2	9000 B	Cherbourg	1893	308,650	2 shield	3	6 6·4-in. Q.F., 4 3·9-in., 8 1·8-in., 11 1·4-in.	6	18·9	587	358
g. v.	Capricorne	W.	483	148	4	23	10	10	5	1	443	Havre	1882	..	..	..	2 5·5-in., 2 3·9-in.	..	11·18	70	80
to. g. b.	Casabianca	S.	960	262	6	26	10	11	6	2	5200 D'A.	Bordeaux	1895	98,985	..	½	1 3·9-in. Q.F., 3 2·5-in., 5 1·8-in., 4 1·4-in.	..	22·0	116	143
2nd cl. *cr.*	Cassard	S.	3952	325	6	44	11	20	6	2	10,143 D'A.	Cherbourg	1896	318,712	2 shield	3	6 6·4-in. Q.F., 4 3·9-in., 10 1·8-in., 3 1·4-in., 2 M.	2	19·8	630	385
to. g. b.	Cassini	S.	958	262	6	27	4	11	6	2	5500 D'A.	Bordeaux	1894	98,500	..	½	1 3·9-in. Q.F., 3 2·5-in., 4 1·4-in.	2	21·2	110	118
2nd cl. *cr.*	Catinat	S. Sh?	4065	331	10	44	8	21	1	2	9000 B	Havre	1896	324,992	2 shield	3	4 6·4-in. Q.F., 10 3·9-in., 10 1·8-in., 4 1·4-in. M.	2	19·0	563	384
2nd cl. *cr.*	Cécille	I. & S.	5933	378	9	49	3	19	9	2	10,200	La Seyne	1888	299,666	..	4	8 6·4-in. Q.F., 10 5·5-in., 6 1·8-in., 14 M.	4	19·0	940	486
2nd cl. *cr.*	Chasseloup-Laubat	S.	3758	308	6	43	6	20	10	2	9000 D'A.	Cherbourg	1893	256,320	..	3	6 6·4-in. Q.F., 4 3·9-in., 8 1·8-in., 12 1·4-in. M.	6	19·25	587	358
1st cl. *cr.*	Châteaurenault	S. Shd.	8018	442	10	55	9	24	6	3	23,000 N.S.	La Seyne	1898	606,656	2 shield	2½	2 6·4-in. Q.F., 6 5.5-in., 10 1·8-in.	..	23	1400 / 2100	625
3rd cl. *cr.*	Coëtlogon	S.	1932	312	0	30	5	14	0	2	5800	St. Nazaire	1889	134,000	..	1½	4 5·5-in. Q.F., 3 other Q.F., 4 M.	5	19·3	200	190
g. v.	Comète	C.	495	151	6	24	9	10	6	1	631	Cherbourg	1884	..	..	..	2 5·5-in., 2 3·9-in., 2 M.	..	12.2	60	84
to. cr.	Condor	S.	1243	216	6	29	3	15	5	2	3800	Rochefort	1885 1896	80,000	..	1½	5 3·9-in. Q.F., 1 2·5-in., 6 M.	5	17·7	160	134

FRANCE.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	in.	in.			knots.	tons.	
3rd cl. *cr.*	**Cosmao**	S.	1954	312	0	30	5	14	0	2	6000	Bordeaux	1888	133,000	..	1½	4 5·5-in. Q.F., 8 other Q.F., 4 M.	5	20·5	200	190
to. g. b.	**Couleuvrine**	S.	435	196	10	21	7	5	11	2	2047	Havre	1885	33,778	..	..	4 1·8-in. Q.F., 3 M.	2	18·0	100	63
to g. b.	**Dague**	S.	408	196	10	21	7	5	11	2	2000	Havre	1885	36,119	..	..	4 1·8-in. Q.F., 3 M.	2	18·0	100	63
2nd cl. *cr.*	**D'Assas**	S.	4000	325	6	44	11	20	6	2	9500 D'A	St. Nazaire	1896	292,682	2 shield	3	6 6·4-in. Q.F., 4 3·9-in., 10 1·8-in., 11 1·4-in.	2	19·25	630	393
2nd cl. *cr.*	**Davout**	S.	2291	295	4	40	0	17	6	2	9000 Nic.	Toulon	1890	221,827	..	3	6 6·4-in. Q.F., 4 3·9-in., 4 2·5-in., 4 1·8-in., 6 M.	4	20·07 *t.*	600	336
g. v.	**Décidée**	S.	645	184	8	26	3	12	2	1	1000 Nic.	Lorient	1899	54,100	..	..	2 3·9-in. Q.-F., 4 2·5-in., 4 1·4-in.	..	13·0	99	99
1st cl. *cr.*	**D'Entrecasteaux**	S. shd.	8114	383	7	58	6	25	9	2	13,500	La Seyne	1896	667,740	10–2¾ n.s.	4	2 9·4-in., 12 5·5-in Q.F., 12 1·8-in.	6	19·2 *t*	650	521
2nd cl. *cr.*	**Descartes**	S. shd.	3990	326	0	42	4	21	4	2	9000 B	St. Nazaire	1894	334,725	..	1½	4 6·4-in. Q.F., 10 3·7-in., 8 1·8-in., 4 1·4-in.	2	21·0 *t*	552	386
cr.	**D'Estaing**	W. & I.	2435	262	5	37	5	18	8	1	3700	Brest	1879	84,718	..	..	15 5·5-in., 8 M.	..	15·31	300	264
3rd cl. *cr.*	**D'Estrées**	S. shd.	2452	311	8	39	4	17	8	2	8500 Nor.	Rochefort	1897	208,200	..	1½	2 5·5-in. Q.F., 4 3·9-in., 8 1·8-in., 2 1·4-in.	..	20·5	345 / 480	234
to. g. b.	**D'Iberville**	S.	967	262	6	27	0	11	2	2	5060 D'A.	St. Nazaire	1893	99,120	..	½	1 3·9-in. Q.F., 1 2·5-in., 4 1·4-in.	6	21·4	117	118
to. g. b.	**Dragonne**	S.	410	196	10	21	7	5	11	2	2000	Havre	1885	36,074	..	..	4 5·5-in. Q.F., 3 M.	2	18·0	100	63
2nd cl. *cr.*	**Du Chayla**	S. shd.	3952	325	6	44	11	20	6	2	10,009 D'A.	Cherbourg	1895	315,835	2 shield	3	6 6·4-in. Q.F., 4 3·9-in., 10 1·8-in., 3 1·4-in., 2 M.	2	20·2 *t*	624	385
to. g. b.	**Dunois (ex M 3)**	S.	896	256	0	27	10	12	8	2	7000 N.S.	Cherbourg	1897	123,383	..	..	6 2·5-in. Q.F., 6 1·8-in.	..	23·0	137	128
cr.	**Éclaireur**	I. & W.	1769	236	3	35	5	17	0	1	2050	Toulon	1877	16,232	..	..	8 5·5-in., 6 M.	..	15·0	200	195
to. cr.	**Epervier**	S.	1288	216	6	29	3	15	5	2	3200	Rochefort	1885	80,000	..	1½	5 3·9-in. Q.F., 1 2·5-in., 6 M.	5	17·6	160	134

cr.	**Fabert**	W.	2100	294	4	36	0	18	4	1	1107	Rochefort	1874	61,967	..	..	8 5·5-in., 4 M.	..	12·42	300	218
to. cr.	**Faucon**	S.	1239	216	6	29	3	15	5	2	3200	Toulon	1887	80,000	..	1½	5 3·9-in. Q.F., 1 2·5-in., 6 M.	5	18·0	150	134
to. g. b.	**Flèche**	S.	425	196	10	21	7	5	11	2	2000	Havre	1885	37,517	..	..	4 1·8-in. Q.F., 3 M.	2	18·0	100	63
3rd cl. *cr.*	**Fleurus**	S.	1310	229	8	29	2	15	4	2	4000 Nic.	Cherbourg	1893	128,530	..	..	5 3·9-in. Q.F., 6 1·8-in., 4 M.	..	17·6 *t*	118	179
,, ,,	**Forbin**	S	1820	312	0	30	5	16	0	2	5700	Rochefort	1888	123,739	..	1½	4 5·5-in. Q.F., 8 other Q.F., 4 M.	5	20·6	200	190
cr.	**Forfait**	W. & I.	2464	249	4	38	0	18	0	1	2764	Toulon	1879	77,019	..	..	15 5·5-in., 8 M.	..	13·44	400	264
cr.	**Foudre** (torpedo transport)	S.	6090	370	6	52	6	23	6	2	11,900 D'A. *t*	Bordeaux	1895	407,712	..	3½	10 3·9-in. Q.F., 4 2·5-in., 4 1·4-in.	..	19·9 *t*	840	410
2nd cl. *cr.*	**Friant**	S.	3739	308	6	43	6	20	10	2	9000 Nic.	Brest	1893	308,750	..	3	6 6·4-in. Q.F., 4 3·9-in. 8 1·8-in., 6 1·4-in.	2	18·19	587	358
g. v.	**Fulton**	W.	913	199	5	28	5	12	8	1	850	Lorient	1887	37,000	..	..	2 5·5-in., 1 3·9-in., 5 M.	..	13·0	160	116
3rd cl. *cr.*	**Galilée**	S.	2317	330	2	34	6	17	10	2	6600 B	Rochefort	1896	208,152	2 shields	1½	4 5·5-in. Q.F., 2 3·9-in., 8 1·8-in., 8 1·4-in.	..	20·0	226	248
1st cl. *cr.*	**Guichen**	S. shd.	8277	436	4	54	10	24	7	3	24,000 D'A	St. Nazaire	1897	611,945	2 shields	2½	2 6·4-in. Q.F., 6 5·5-in., 10 1·8-in.	..	23·0	1460	625
3rd cl. *cr.*	**Infernet**	S shd.	2452	311	8	39	4	15	6	2	8500 Nor.	Bordeaux	1899	193,000	..	..	2 5·5-in. Q.F., 4 3·9-in. 8 1·8-in.	..	20·5	345 480	234
2nd cl. *cr.*	**Isly**	S.	4477	346	0	43	6	19	6	2	8100	Brest	1891	252,760	..	3	4 6·4-in. Q.F., 6 5·5-in., 14 2·5-in. and 1·8-in., 8 M.	5	18·3	880	332
2nd cl. *cr.*	**Jurien de la Gravière**	S. shd.	5605	440	0	48	8	22	0	3	17,000 Guyot	Lorient	1899	475,979	..	3	8 6·4-in. Q.F., 12 1·8-in.	2	23·0	600 900	511
2nd cl. *cr.*	**Jean Bart** *	S.	4109	346	0	43	6	19	6	2	8000	Rochefort	1889	283,240	..	4	4 6·4-in. Q.F., 6 5·5-in., 14 2·5-in., and 1·8-in., 8 M.	5	19·0	940	332

* To receive Niclausse W.T. boilers, for 10,000 I.H.P.

FRANCE.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	inches.	inches.			knots.	tons.	
g. v.	Kersaint	S. shd.	1243	226	0	34	5	15	0	1	2200	Rochefort	1897	107,933	..	..	1 5·5-in. Q.F., 5 3·9-in., 7 1·4-in.	..	15·0	199	110
to. g. b.	La Hire	S.	896	256	0	27	10	12	9	2	7000 N.S.	Cherbourg	1898	123,383	..	..	6 2·5-in. Q.F., 6 1·8-in.	..	23·0	137	128
3rd cl. *cr.*	Lalande	S.	1926	311	6	31	2	14	0	2	6000	Bordeaux	1888	133,800	..	1½	6 5·5-in. Q.F., 8 other Q.F., 4 M.	5	22·0	200	190
to. g. b.	Lance	S.	402	196	10	21	7	5	11	2	2000 Du T.	Havre	1886	39,964	..	..	4 1·8-in. Q.F., 3 M.	2	18·0	100	63
cr.	Lavoisier	S	2317	330	2	34	6	17	10	2	6400 B	Rochefort	1897	202,024	2 shield	1½	4 5·5-in. Q.F., 2 3·9-in., 8 1·8-in., 2 1·4-in., 4 M.	2	20·0	226	248
to. g. b.	Léger	S.	517	197	0	23	0	10	6	2	2360 B	Lorient	1891	52,000	..	..	1 3 9-in. Q.F., 3 2·5-in., 4 1·4-in.	3	18·8	130	69
to. g. b.	Lévrier	S.	505	197	0	23	0	10	6	2	2240 B	Lorient	1891	52,000	..	..	1 3·9-in. Q.F., 3 2·5-in., 4 1·4-in.	3	18·5	130	69
3rd cl. *cr.*	Linois	S.	2345	321	6	34	6	17	5	2	6600	La Seyne	1894	163,014	3·9	1½	4 5·5-in. Q.F., 2 3·9-in., 8 1·8-in., 4 1·4-in., 4 M.	4	20·5	200	248
g. v.	Lion	C.	503	151	6	24	9	10	6	1	576	Havre	1884	23,146	..	..	2 5·5-in., 4 M.	..	11·8	70	84
3rd cl. *cr.*	Milan	S.	1733	303	2	32	10	14	7	2	3986 B	St. Nazaire	1886	89,058	..	..	5 3·9-in. Q.F., 8 M.	2	18·1	400	186
cr.	Naiade	I. shd.	3686	246	0	47	2	22	10	1	2700	Toulon	1881	128,275	..	..	2 6·4-in., 18 5·5-in., 10 M.	..	13·68	500	490
2nd cl. *cr.*	Pascal	S.	4015	326	0	42	4	21	4	2	9000 *t*, B	Toulon	1895	322,321	..	1½	4 6·4-in. Q.F., 10 3·9-in., 8 1·8-in., 4 1·4-in. M.	2	20·0 *t*	650	378

2nd cl. *cr.*	Protet	S. shd.	4055	331	10	44	8	21	1	2	9300	Bordeaux	1898	324,992	2 shield	$2\frac{1}{2}$	4 6·4-in. Q.F., 10 3·9-in., 10 1·8-in., 2 1·4-in.	2	20·2 *t*	563	384
to. g. b.	Sainte Barbe	S.	437	196	10	21	7	5	11	2	2000	Rouen	1885	43,233	..	$1\frac{1}{2}$	4 1·8-in. Q.F., 3 M.	2	18·0	100	63
,,	Salve	S.	413	196	10	21	7	5	11	2	2000	Rouen	1886	42,538	..	$1\frac{1}{2}$	4 1·8-in. Q.F., 3 M.	2	18·0	100	63
g. v.	Scorpion	C.	505	151	6	24	9	10	6	1	511	Havre	1883	23,459	..	..	2 5·5-in., 3 M.	..	11·0	70	84
2nd cl. *cr.*	Sfax	S.& W.	4728	288	9	49	3	24	9	2	6522	Brest	1884 1898	200,000	..	$1\frac{1}{2}$	6 6·4-in. Q.F., 10 5·5-in., 6 1·8-in., 6 1·4-in., 4 M.*	2	16·84	715	473
2nd cl. *cr.*	Suchet	S.	3440	318	3	43	6	17	6	2	9000	Toulon	1893	226,360	..	3	4 6·4-in. Q.F., 4 3·9-in., 4 1·8-in., 8 1·4-in., 6 M.	7	20·4 *t*	480	246
3rd cl. *cr.*	Surcouf	S.	2044	312	0	30	5	14	0	2	6000	Cherbourg	1888	131,200	..	$1\frac{1}{2}$	4 5·5-in. Q.F., 8 other Q.F., 4 M.	5	20·5	200	190
g. v.	Surprise	S.	627	184	8	24	7	12	3	1	853 *t*	Havre	1895	50,954	..	..	2 3·9-in. Q.F., 4 2·5-in., 4 1·4-in.	..	13·4 *t*	73	99
1st cl. *cr.*	Tage	S. shd.	7589	390	0	53	8	22	10	2	12,410	St. Nazaire	1886	93,857	..	..	8 6·4-in., 10 5·5-in., 2 2·5-in., 6 Q.F., 14 M.	7	19·0	1000	400
3rd cl. *cr.*	Troude	S.	2026	311	6	31	2	14	0	2	6000	Bordeaux	1888	33,383	..	$1\frac{1}{2}$	4 5·5-in. Q.F., 8 other do., 4 M.	5	20·9	200	190
t. g. b.	Vautour	S.	1235	216	6	29	3	15	5	2	3391	Toulon	1886	87,733	..	$1\frac{1}{2}$	5 3·9-in. Q.F., 1 2·5-in. do., 6 M.	5	17·3	150	134
g. v.	Vipère	C.	486	145	4	23	10	10	6	1	441	Rochefort	1881	26,835	..	..	2 5·5-in., 2 3·9-in.	..	10·3	60	80
t. g. b.	Wattignies	S.	1292	230	0	29	3	15	0	2	4189	Rochefort	1891	111,000	..	..	5 3·9-in. Q.F., 6 1·8-in., 7 1·4-in., M.	4	18·61	160	180
g. v.	Zélée	S.	616	185	6	26	0	10	6	1	1000 Nic.	Rochefort	1899	..	..	..	2 3·9-in. Q.F., 4 2·5-in., 4 1·4-in.	..	13·0	..	75

* New armament.

Shallow-draught gunboats Argus and Vigilante launched at Chiswick (Thornycroft) 1900:—displacement, 122 tons; length, 145 ft.; beam, 24 ft.; draught, 2 ft.; 2 screws; 550 I.H.P.; 13 knots; 2 3·5-in., 4 1·4-in. Q.F. guns; complement, 30; coal capacity, 80. Transport dispatch vessel Vaucluse, launched 1901.

Merchant Cruisers (Auxiliary to French Navy).

To what Company belonging.	Name.	Register Tonnage.	Length.	Beam.	Depth.	H.P. (nominal.)	Speed.	When built.
		Tons.	Feet.	Feet.	Feet.		Knots.	
Compagnie Générale Transatlantique	La Lorraine	11,869	563·1	60·0	35·9	2108	20	1900
	La Savoie	11,200	563·1	60·0	35·9	2108	20	1900
	L'Aquitaine	8810	500·0	57·3	34·0	1825	19	1890
	La Touraine	9047	520·2	56·0	34·6	1616	19	1890
	Duc de Bragance	2096	334·6	34·2	16·8	426	17½	1889
	Eugène Pereire	2078	334·6	35·1	23·9	437	17½	1888
	Général Chanzy	2299	341·2	35·7	15·5	478	17½	1891
	La Bretagne	7112	495·4	51·8	34·5	1149	17½	1886
	La Champagne	7087	493·4	51·8	34·5	1149	17½	1885
	La Gascogne	7395	495·4	52·2	34·8	1308	17½	1886
	Maréchal Bugeaud	2206	342·5	34·1	23·0	482	17½	1890
	Ville d'Alger	2211	342·7	36·1	23·0	208	17½	1890
	La Navarre	6648	471·0	50·5	36·4	983	17	1892
	La Normandie	6283	459·3	49·2	34·1	1147	16	1882
	Ville de Tunis	1966	317·3	34·6	16·8	444	15½	1884
	Moïse	1873	310·0	33·5	16·7	443	15	1880
	St. Augustin	1854	314·0	33·8	16·5	443	15	1880
	Versailles	4336	373·7	45·3	27·0	780	..	1882
	Ville de Madrid	1874	308·7	33·5	16·7	370	15	1880
	Ville de Naples	1879	311·6	34·1	16·7	506	15	1881
Messageries Maritimes	Armand Béhic	6635	486·6	50·1	36·8	821	17½	1892
	Australien	6570	482·3	49·2	34·1	818	17½	1889
	Polynésien	6569	482·3	49·2	34·1	818	17½	1890
	Ville de la Ciotat	6631	485·8	49·9	36·8	819	17½	1892
	Annam	6344	416·2	50·9	36·1	832	17½	1898
	Atlantique	6708	468·9	50·6	32·8	832	17½	1899
	Tonkin	6364	416·2	50·9	36·1	832	17½	1898
	Ernest Simons	4562	442·9	47·1	36·7	727	..	1893
	Indus	6357	446·2	50·8	36·1	417	..	1897
	Brésil	5876	463·9	46·4	32·5	743	16½	1889
	Chili	6375	462·6	47·6	36·7	719	..	1894
	Cordillère	6379	462·6	47·6	36·1	721	..	1895
	La Plata	5807	462·6	45·9	32·5	520	16½	1889

Note.—The armament for the larger ships is 7 5·5-in. and smaller quick-firers.

GERMANY.—Armoured Ships.

Class.	NAME.	Material.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position	Armour. Deck Plating	Armament. Guns.	Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.				£	ins.	ins.	ins.			knots.	tons.	
c. d. s.	Aegir	S.	3600	236 6	50 6	17 9	2	4800 T.	Kiel	1895	233,500	9½ H.S.	8¾ H.S.	2	3 9·4-in., 10 3·4-in. Q.F. 6 M.	3 (1 sub.)	14·8	225 †	276
b.	Baden	I.	7441	321 6	60 0	15 8	2	6200 Dürr.	Kiel	1880 1897	444,886	16	10	3	6 10·2-in., 8 3·4-in. Q.F., 8 1·4-in., 1 l., 6 M.	5 (2 sub.)	14·0	700	376
a. g. b.	Basilisk	I.	1109	154 3	36 0	10 2	2	759	Bremen	1878	58,042	8	8	2	1 12-in., 2 3·3-in., 2 M.	2	9·0	40	76
b.	Bayern	I.	7441	321 6	60 0	19 8	2	6326 Dürr.	Kiel	1878 1896	406,660	16	10	3	6 10·2-in., 8 3·4-in. Q.F., 8 1·4-in., 1 l., 6 M.	5 (2 sub.)	14·0	700	376
c. d. s.	Beowulf*	S.	4114	267 0	49 3	17 9	2	4800 T.S.	Bremen	1890 1902	175,000	9½	8	1¼	3 9·4-in., 10 3·4-in. Q.F., 7 M.	4	15·0	580 †	297
b.	Brandenburg	S.	10,100	354 4	65 0	24 7	2	9640	Stettin (Vulcan)	1891	606,500	15¾ comp.	11¾ comp.	2½	6 11-in., 6 4·1-in. Q.F., 8 3·4-in., 12 1·4-in., 8 M., 2 l.	6	16·5	680 800	552
a. g. b.	Biene	I.	1109	154 3	36 0	10 2	2	759	Bremen	1876	62,853								
a. g. b.	Camäleon	I.	1109	154 3	36 0	10 2	2	759	Bremen	1878	57,564	8	8	2	1 12-in., 2 3·3-in., 2 M.	2	10·0	40	76
,,	Crocodil	I.	1109	154 3	36 0	10 2	2	759	Bremen	1879	57,237								
b.	Deutschland	I.	7319	280 0	62 4	24 7	1	5360	Poplar	1874	412,022	10	8	2	8 10·2-in., 7 5·9-in., 9 3·4-in. Q.F., 12 M., 2 l.	5	14·5	710	668
t.	Friedrich der Grosse	I.	6770	307 0	53 6	24 7	1	5400	Kiel	1874	365,170	9¼	8 br. 10 tur.	..	4 10·2-in., 2 6·6-in., 10 3·4-in. Q.F., 8 M., 2 l.	4	14·0	550	537
a. c.	Fürst Bismarck	S. shd.	10,650	393 8	66 9	26 0	3	14,000 Dürr.	Kiel	1897	..	7¾ H. S.	7¾ H. S.	3	4 9·4-in., 12 5·9-in. Q.F., 10 3·4-in., 10 1·4-in., 8 M.	6 (5 sub.)	19.0	1000†	565
c. d. s.	Frithjof	S.	3500	240 0	49 3	17 9	2	4800 T. S.	Bremen	1891	175,000	9¼ H. S.	7¾ H. S.	1¼	3 9·4-in., 8 3·4-in. Q.F., 6 M.	4	14·8	225	276
t.	H. J.	S.	13,200	398 6	72 10	24 10	3	16,000 W. T. & C.	Germania Danzig	Bldg.	..	9–4 K. S.	10–6 K. S.	3	4 11-in., 12 6·7-in. Q.F., 12 1·4-in., 8 M.	6 (5 sub.)	19·0	800 / 1650	..
t.	K. L.‡							16,000 W.T.&C	..	Pro.	..								

* Reconstructed and lengthened. † Also liquid fuel. ‡ Estimates, 1902

GERMANY.—Armoured Ships—*continued*.

Class	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position.	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	in.	in.			knots.	tons.	
c. d. s.	**Hagen***	S.	4114	267 0	49 3	17 9	2	5250 T.	Kiel	1893 1900	..								
c. d. s.	**Heimdall***	S.	4114	267 0	49 3	17 9	2	4393 T. S.	Wilhelmshaven	1892 1902	233,500	7 K. S.	7¾ H. S.	1¼	3 9·4-in., 10 3·4-in. Q.F., 7 M.	4	15·0	580†	297
c. d. s.	**Hildebrand***	S.	4114	267 0	49 3	17 9	2	4413 T. S.	Kiel	1892	218,000								
a. g. b.	**Hummel**	I.	1109	143 0	36 0	10 2	2	759	Bremen	1881	56,741	8	8	2	1 12-in., 2 3·3-in., 2 M.	2	10·0	40	76
b.	**Kaiser**	I.	7531	292 0	62 4	24 7	1	5700	Poplar	1874	411,301	10	10	2	8 10·2-in., 1 5·9-in., 6 4-in., 9 3·4-in. Q.F., 2 M., 2 l.	5	14·6	710	668
a. c.	**Kaiser** (Ersatz)¶	S.	9050	396 0	64 3	25 3	3	16,000 Dürr.	Kiel.	Bldg.		4 K.S.	6 K.S.	2¾	4 8·2-in., 10 5·9-in. Q.F., 12 3·4-in., 10 1·4-in., 1 M.	4 (3 sub.)	21·0	950 1500†	528
t.	**Kaiser Barbarossa**							13,000 C.&T.	Danzig	1896									
t.	**Kaiser Friedrich III.**							13,000 C.&T.	Wilhelmshaven	1900									
t.	**Kaiser Wilhelm II.**§	S.	11,150	377 4	66 10	25 6	3	13,000 C.&T.S.	Wilhelmshaven	1897	706,000	11¾ H. N. S.	9¾–6 H. N. S.	3	4 9·4-in. Q.F., 18 5·9-in. Q.F., 12 3·3-in., 12 1·4-in., 8 M.	6 (5 sub.)	18·0	650 1000†	700
	Kaiser Wilhelm der Grosse							13,000 C.&T.S.	Germania	1899									
t.	**Kaiser Karl der Grosse**							13,000 C.&T.S.	Hamburg (Blohm & Voss)	1899									
b.	**König Wilhelm**	I.	9757	355 0	60 0	26 7	1	8350	Blackwall	1868 1896	505,141	12	6	2½	20 5·9-in. Q.F., 18 3·4-in., 8 M., 4 l.	5	14·7	700	759
a. c.	**König Wilhelm** (Ersatz)	S.	9050	396 0	64 3	25 3	3	16,000 Dürr.	Hamburg	Bldg.		4 K.S	6 K.S.	2¾	4 8·2-in., 10 5·9-in. Q.F., 12 3·4-in., 10 1·4-in., 4 M.	4 (3 sub.)	21·0	950 1500†	528
b.	**Kurfürst Friedrich Wilhelm.**	S.	10,100	354 4	65 0	24 7	2	9959	Wilhelmshaven	1891	653,000	15¾ comp.	11¾ comp.	2½	6 11-in., 6 4·1-in. Q.F., 8 3·4-in., 12 1·4-in., 8 M., 2 l.	6	16·0	680 800	552
t.	**Mecklenburg** (F)	S.	11,800	393 9	68 2	24 10	3	14,000 C.&T.S.	Stettin (Vulcan)	1901	832,500	9–4 K.S.	10–6 K.S.	3	4 9·4-in. Q.F., 18 5·9-in. Q.F., 12 3·3-in., 12 1·4 in., 8 M.	6 (5 sub.)	18·0	700 1450†	715

a. g. b.	**Mücke**	I.	1109	154	3 36	0 10	2	2	759	Bremen	1877	60,960	8	8	2	1 12-in., 2 3·3-in., 2 M.	2	10·0	40	76
a. g. b.	**Natter**	I.	1109	154	3 36	0 10	2	2	759	Bremen	1880	52,822								
c. d. s. b.	**Odin***	S.	4114	267	0 49	3 17	9	2	4800 T. S.	Danzig	1894	..	9½ H. S.	8¾ H. S.	2	3 9·4 in., 10 3·4-in. Q.F., 6 M.	3 (1 sub.)	15·0	225†	266
b.	**Oldenburg**	S.	5200	246	0 59	0 19	6	2	3900	Stettin	1884	235,342	13 comp.	8 comp.	1	8 9·4-in. (K.), 2 3·4-in. Q.F., 6 M.	4	13·5	475	356
a. c.	**Prinz Adalbert**	S.	9050	396	0 64	3 25	3	3	16,000 Dürr.	Kiel	1901		4 K.S.	6 K.S.	2¾	4 8·2-in., 10 5·9-in. Q.F., 12 3·4-in., 10 1·4-in., 4 M.	4 (3 sub.)	21·0	950 1500†	528
a. c.	**Prinz Heinrich**	S.	8868	396	0 64	3 25	3	3	15000 Dürr.	Kiel	1900	..	4 K.S.	6 K.S.	2¾	2 9·4-in., 10 5·9-in. Q.F., 10 3·4-in., 10 1·4-in., 4 M.	4 (3 sub.)	20·5	950	528
b.	**Sachsen**	I.	7441	321	6 59	0 21	0	2	6000 Dürr.	Stettin	1877 1896	422,178	15¾	15¾	3	6 10·2-in. (K.), 8 3·4-in. Q.F., 8 1·4-in., 1 l., 6 M.‖	5 (2 sub.)	14·0	700	376
t.	**Schwaben (G)**	S.	11,800	393	9 68	2 24	10	3	14,000 C.&T.S.	Wilhelmshaven	1901	832,500	9–4 K.S.	10–6 K.S.	3	4 9·4-in. Q.F., 18 5·9-in. Q.F., 12 3·3-in., 12 1·4-in., 8 M.	6 (5 sub.)	18·0	700 1450†	715
c. d. s.	**Siegfried***	S.	3500	240	0 49	3 17	9	2	4800 T. S.	Germania	1889	175,000	9½	7¾	1¼	3 9·4-in., 6 3·4-in. Q.F., 6 M.	4	14·8	225†	276
a. g. b.	**Salamander**	I.	1109	154	3 36	0 10	2	2	759	Bremen	1880	56,914								
„	**Skorpion**	I.	1109	154	3 36	0 10	2	2	759	Bremen	1877	60,796	8	8	2	1 12-in., 2 3·3-in., 2 M.	2	10·0	40	76
„	**Viper**	I.	1109	154	3 36	0 10	2	2	759	Bremen	1876	61,463								
„	**Wespe**	I.	1109	154	3 36	0 10	2	2	759	Bremen	1876	53,771								
b.	**Weissenburg**	S.	10,100	354	4 65	0 24	7	2	9000	Stettin (Vulcan	1891	659,475	15¾	11¾	2½	6 11-in., 6 4·1-in. Q.F., 8 3·4-in., 12 1·4-in., 8 M., 2 l.	6	16·0	680 800	552
t.	**Wettin (D)**	S.	11,800	393	9 68	2 24	10	3	14,000 C.&T.S.	Schichau	1901	832,500	9–4 K.S.	10–6 K.S.	3	4 9·4-in. Q.F., 18 5·9-in. Q.F., 12 3·3-in., 12 1·4-in., 8 M.	6 (5 sub.)	18·0	700 1450	715
t.	**Wittelsbach**									Wilhelmshaven	1900	832,500								
b.	**Wörth**	S.	10,100	354	4 65	0 24	7	2	10,224 (t)	Kiel	1892	595,250	15¾	11¾	2½	6 11-in., 6 4·1-in. Q.F., 8 3·4-in., 12 1·4-in., 8 M., 2 l.	6	16·0‡	680 800	552
b.	**Württemberg**	I.	7441	321	6 60	0 19	8	2	6000 T. S.	Stettin	1878 1898	402,512	15¾	10	3	6 10·2-in. (K.), 8 3·4-in. Q.F., 8 1·4-in., 1 l., 6 M.‖	5 (2 sub.)	14·0	700	376
t.	**Zähringen (E)**	S.	11,800	393	9 68	2 24	10	3	15,000 C.&T.S.	Germania	1901	832,500	9–4 K.S.	10–6 K.S.	3	4 9·4-in. Q.F., 18 5·9-in. Q.F., 12 3·3-in., 12 1·4-in., 8 M.	6 (5 sub.)	19·0	650 1000†	715

* Coast defence ships reconstructed, and lengthened 27 ft. amidships. Odin to be put in hand.
§ Kaiser Wilhelm II. specially fitted as fleet flagship to receive the Emperor, with a staff of 64.
† Also liquid fuel.
‖ New armament.
‡ Wörth: trial, 17·2 knots.
¶ Estimates, 1902.

The **Arminius, Friedrich Carl,** and **Kronprinz** are now used for harbour service.

GERMANY.—Cruising Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	inches.	inches.			knots	tons.	
3rd cl. *cr.*	**Alexandrine** . .	I. S. & W.	2373	236	3	42	7	18	4	1	2400	Kiel . .	1885	102,877	..	..	10 5·9-in., 4 4·1-in., 10 M., 1 l.	1	14·0	300	267
,, ,,	**Amazone** (F) . .	S.	2665	328	0	38	7	16	0	2	8000 T.S.	Kiel (Germania)	1900	167,500	..	2	10 4·1-in. Q.F., 10 1·4-in., 4 M., 2 l.	2 (sub.)	22·0	550	249
,, ,,	**Arcona** . .	I. S. & W.	2373	236	3	42	7	18	4	1	2400	Danzig . .	1885	109,875	..	..	10 5·9-in., 4 4·1-in., 10 M., 1 l.	1	14·0	300	267
,, ,,	**Ariadne** . .	S.	2665	328	0	38	7	16	0	2	8000 T.S.	Bremen (Weser)	1900	167,500	..	2	10 4·1-in. Q.F., 14 1·4-in., 4 M., 2 l.	2 (sub.)	21·5	550	249
,, ,,	**Blitz** . . .	S.	1382	246	0	32	10	13	5	2	2839	Kiel . .	1882	66,935	..	..	6 3·4-in., 4 M. . .	1	16·0	250	127
g. b. .	**Bremse** . .	S.	866	203	5	27	10	10	6	1	1500	Bremen .	1884	49,308	..	2½	1 8·2-in. . . .	..	15·0	65	73
g. b. .	**Brummer** . .	S.	866	203	5	27	10	10	6	1	1500	Bremen .	1884	52,422	..	2½	1 8·2-in. . . .	..	15·0	65	73
3rd cl *cr.*	**Bussard** . .	S.	1857	256	0	30	2	18	4	2	2900	Danzig .	1890	..	..	3	8 4·1-in. Q.F., 7 M. . .	2	16·5	400	..
,, ,,	**Falke** . . .	S. & W.	1731	246	0	33	6	15	0	2	2900	Kiel . .	1891	..	..	3	8 4·1-in. Q.F., 7 M. . .	2	15·5	400	..
3rd cl. *cr.*	**Frauenlob** (G). **H.** **J.***	S.	2665	328	0	38	7	16	0	2	8000 T.S.	Bremen (Weser) 1902; ,, ,, Bldg.; Kiel (Howaldt). Bldg.		167,500	..	2	10 4·1-in. Q.F., 14 1·4-in., 4 M., 2 l.	2 (sub.)	21·5	550	249
2nd cl. *cr.*	**Freya** . . .	S.	5650	344	5	57	0	20	8	3	10,000 Nic.	Danzig . .	1897	..	4 N.S.	4 N.S.	2 8·2-in. Q.F., 8 6-in. Q.F., 10 3·4-in., 10 1·4-in., 4 M.	3 (sub.)	19·5	500	440
3rd. cl. *cr.*	**Gazelle** . .	S. & bronze shd.	2650	328	0	38	7	16	9	2	6400 Nic.	Kiel (Germania)	1898	130,000	..	2	10 4·1-in. Q.F., 14 1·4-in., 4 M., 2 l.	3 (1sub.)	19·0	600	210
2nd ,,	**Geflon** . .	S.	4207	344	6	12	8	20	8	2	9000	Danzig (Schichau)	1893	..	..	1¼	10 4·1-in. Q.F., 6 2·1-in., 1 l., 8 M.	2	19·0	950	312
3rd ,,	**Geier** . . .	S. & W. shd.	1776	249	4	34	10	15	6	2	2960	Wilhelmshaven	1894	..	..	3	8 4·1-in. Q.F., 7 M. .	2	16·2	400	130
,, ,,	**Greif** . . .	S.	2000	318	0	32	0	14	9	2	5400	Kiel . .	1886	..	..	..	2 3·4-in. Q.F., 4 M. .	..	19·0	350	
g. v. .	**Habicht** . .	I. & W.	848	174	0	29	6	11	5	1	600	Elbing .	1879	33,054	..	..	5 4·9-in., 5 M. . . .	..	12·0	100	128
2nd cl. *cr.*	**Hansa** . . .	S. shd.	5900	345	7	57	10	21	8	3	10,000 B	Stettin (Vulcan)	1898	..	4 N.S.	4 N.S.	2 8·2-in. Q.F., 8 6-in., 10 3·4-in., 10 1·4-in., 4 M.	3 (sub.)	19·5	500	440

d.v.	Hela	S.	2000	328	0	36	0	..		2	5860	Bremen	1895	..	..	1¼	4 3·4-in. Q.F., 6 1·9-in., 2 M.	3	20·0	347	169
2nd cl. cr.	Hertha	S.	5650	344	6	57	0	21	8	3	10,000 B	Stettin (Vulcan)	1897	..	4	4 N.S.	2 8·2-in. Q.F., 8 6-in., 10 3·4-in., 10 1·4-in., 4 M.	3 (sub.)	19·5	500†	440
g. b.	Iltis	S. (shd.)	895	203	6	29	10	10	8	2	1300 T	Danzig (Schichau)	1898	100,000	..	..	8 3·4-in. Q.F., 6 1·4-in., 2 M.	..	13·5	160	121
2nd cl. cr.	Irene	S.	4400	308	0	46	0	21	0	2	8000	Stettin	1887	220,000	..	3	4 5·9-in., 8 4·1-in. Q.F., 6 1·9-in., 1 l., 8 M.	4	19·8	900	358
to. g. b.	Jagd	S.	1250	275	6	31	6	13	9	2	4000	Bremen	1888	..	..	2	4 3·4-in. Q.F., 2 M.	3	20·0	230	126
g. b.	Jaguar	S. (shd.)	895	203	6	29	10	10	8	2	1300 T	Danzig (Schichau)	1898	100,000	..	..	8 3·4-in. Q.F., 6 1·4-in., 2 M.	..	13·5	160	..
1st cl. cr.	Kaiserin Augusta	S. (shd.)	6331	387	0	52	6	23	0	3	14,000	Kiel (Germania)	1892	..	..	3½	12 5·9-in., 8 3·4-in. Q.F., 2 l., 8 M.	5	21·0	800	427
to. g. b.	Komet	S.	946	262	6	31	2	13	9	2	5000	Stettin	1892	..	..	2	4 3·4-in. Q.F., 2 M.	1	21·0 (t)	120	90
3rd cl. cr.	Kondor	S. & W.	1640	246	0	33	6	15	0	2	2930	Hamburg	1892	..	..	3	8 4·1-in. Q.F., 7 M.	2	16·5	400	..
3rd cl. cr.	Kormoran	S. & W.	1640	246	0	33	6	15	0	2	2930	Danzig	1892	..	..	3	8 4·1-in. Q.F., 7 M.	2	16·0	400	..
g. b.	Luchs	S.	977	206	8	30	4	10	8	2	1300 T	Danzig	1899	..	..	..	8 3·4-in. Q.F., 6 1·4-in., 2 M.	..	13·5	120	..
3rd cl. cr.	Medusa	S.	2665	328	0	38	7	16	0	2	8000 T.S.	Bremen (Weser)	1900	167,500	..	2	10 4·1-in. Q.F., 14 1·4-in., 4 M., 2 l.	2 (sub.)	21·5	500	249
d. v.	Meteor	S.	946	262	6	29	6	11	6	2	4500	Gaarden	1890	..	..	2	2 3·4-in. Q.F., 2 M.	3	21·0	120	90
3rd cl. cr.	Niobe	S.	2665	328	0	38	7	15	1	2	8000 T.	Bremen (Weser)	1899	167,500	..	2	10 4·1-in. Q.F., 14 1·4-in., 4 M., 2 l.	2 (sub.)	21·5	500	250
3rd cl. cr.	Nymphe	S.	2665	328	0	38	7	15	1	2	8000 T.S.	Kiel (Germania)	1899	167,500							
cr.	Olga	I. & W.	2100	226	4	42	7	18	4	1	2100	Stettin	1880	113,812	..	..	8 5·9-in., 2 3·4-in. Q.F., 1 l., 6 M.	..	14·0	320	267
g. b.	Panther	S.	977	206	8	30	4	10	8	2	1300 T.S.	Danzig	1901	..	..	..	8 3·4-in. Q.F., 6 1·4-in., 2 M.	..	13·5	120	..
cr.	Pelikan (mining ship)	S.	2360	259	0	38	0	14	5	2	3000	Kiel	1890	..	..	..	4 3·4-in. Q.F., 4 M.	..	15·4	370	183
3rd cl. cr.	Pfeil	S.	1382	246	0	32	10	13	5	2	2700	Wilhelmshaven	1882	73,605	..	..	4 3·4-in. Q.F., 4 M.	1	16·0	250	127
2nd cl. cr.	Prinzess Wilhelm	S.	4400	339	6	46	0	21	0	2	8000	Gaarden	1887	220,000	..	3	4 5·9-in., 8 4·1-in. Q.F., 6 1·9-in., 1 l., 8 M.	4	18·7	900	358
g. v.	Schwalbe	S. & W.	1120	203	0	30	6	12	4	2	1500	Wilhelmshaven	1887	..	..	3	8 4·1-in. K., 7 M.	..	13·5	300	150

* Three of similar type projected in Estimates, 1902—viz., K., L., and Ersatz Zieten, of 2715 tons and 24 knots speed—also the gunboat B.

GERMANY.—Cruising Ships—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour: Gun Position.	Armour: Deck.	Armament: Guns.	Armament: Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	in.			knots	tons.	
3rd cl. *cr.*	Seeadler	S. & W.	1640	246 0	33 6	15 0	2	2800	Hamburg	1892	..	..	3	8 4·1-in., 7 M.	2	16·0	400	156
„ ..	Sophie	I. & W.	2100	226 4	42 7	18 4	1	2100	Danzig	1892	117,155	..	..	8 5·9-in., 2 3·4-in. Q.F., 1 l., 6 M.	..	14·0	320	267
g. v.	Sperber	S. & W.	1120	236 0	29 8	12 6	2	1500	Wilhelmshaven	1888	..	..	3	8 4·1-in., 6 M.	..	13·5	300	150
3rd cl. *cr.*	Thetis	S.	2665	344 6	38 7	16 0	2	8000 T.S.	Danzig	1900	167,500	..	2	10 4·1-in. Q.F., 14 1·4-in., 4 M., 2 l.	2 (sub.)	21·5	550	249
g. b.	Tiger	S.	894	203 6	29 10	10 8	2	1300 T.S.	Danzig	1899	..	..	..	8 3·4-in. Q.F., 6 1·4-in., 2 M.	..	13·5	160	..
2nd cl. *cr.*	Victoria Luise	S.	5650	344 5	57 0	21 8	3	10,000 Dürr.	Bremen	1897	..	4 H.S.	4 H.S.	2 8·2-in. Q.F., 8 6-in. Q.F., 10 3·4-in., 10 1·4-in., 4 M.	3 sub.	19·5	500	440
„ „	Vineta	S. shd.	5900	345 7	57 10	21 8	3	10,000 Dürr.	Danzig	1897								
3rd cl. *cr.*	Wacht *	S.	1250	262 0	31 6	13 9	2	4000	Bremen	1887	..	..	2	4 3·4-in. Q.F., 2 M.	3	19·6	230	126
d. v.	Zieten	I.	1010	226 6	27 11	13 8	1	2350	Blackwall	1876	81,755	..	..	6 1·9-in. Q.F., 6 M.	..	15·9	140	111

* Lost after collision with the Sachsen in the manœuvres, 1901.

The Charlotte, Marie, Mars, Grille, Hay, Ulan, Brummer, Nixe, Olga, Rhein, Moltke, Stein, and Stosch are used as schoolships. The Blücher (2856 tons), built at Kiel in 1877, is the torpedo training ship, and the Carola (2169 tons), built at Stettin in 1880, the gunnery ship.

The Imperial Yacht Hohenzollern, 4187 tons, 9460 I.H.P., 22 knots, carries 8 1·9-in. Q.F., but provision is made for mounting 3 4·1-in., 12 1·9-in. Q.F. and 4 M.

The station vessel for Constantinople is named the Loreley. The Vorwärts and Schamien, gunboats, are converted trading vessels for river service in China.

Storeships—Möwe, Wolf, Hyäne.

Merchant Cruisers (Auxiliaries to the German Navy).

To what Company belonging.	Name of Ship.	Register Tonnage.	Length.		Beam.		Draught of Water.		Indicated H.P.	Ocean Speed.	When Built.	Armament of each Ship.
		tons.	ft.	in.	ft.	in.	ft.	in.		knots.		
	Fürst Bismarck	8430	504	4	57	6	22	3	16,400	19½	1891	
	Auguste Victoria	8479	522	2	56	4	23	0	12,280	18	1889	
Hamburg-American S.S. Co.	Deutschland	16,502	662	7	67	0	..		33,000	23	1900	
	Columbia	7241	461	6	55	8	..		1658(a)	19	1889	
	Hamburg	10,600	499	3	60	1	..		1016(a)	16	1889	
	Kiautchau	10,911	522	5	60	1	..		1016(a)	16	1900	
	Lahn	5351	449	6	49	0	22	0	9500	18½	1887	
	Kronprinz Wilhelm	14,800	640	0	66	0	..		3500(a)	23	1901	8 5·9-in., 4 4·7-in., 2 3·4-in. Q.F., 2 2·2-in., 14 M. (Uncertain.)
	Kaiser Wilhelm der Grosse	14,349	625	0	66	0	27	0	27,000	22	1897	
North German Lloyd	Kaiser Wilhelm II	20,000	678	0	72	0	..		2423(a)	23	1901	
	Kaiser Friedrich III.	17,000	580	9	63	11	..		25,000	22	1897	
	Kaiserin Maria Theresia	8286	526	0	52	0	..		1871(a)	20	1890	
	Aller	5217	436	6	48	0	..		1300(a)	16	1885	
	Trave	5262	436	6	48	0	..		1300(a)	16	1886	
Schichau	Kaiser Friedrich	12,480	581	7	63	7	..		..	19	1897	

(a) Nominal horse-power.

Many other vessels of the same companies are on the list, steaming at less than 16 knots.

GREECE.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Battery.	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.					inches.	inches.	ins			knots.	tons.	
c.d.s.	Basileos Georgios	I.	1774	200 2	36 0	15 6	2	2100	Blackwall	1867	..	7	6	9	2 6·6-in. (K.), 1 5·9-in. 9 M.	1	12·0	210	120
br.	Basilissa Olga .	W.	2030	230 0	59 0	18 0	1	1950	San Rocco	1869	..	6	4½	..	4 6·6-in. 5½-ton (K.), 2 6·6-in. 3½-ton, 4 M., 4 l. .	3	10·0	240	400
b.	Hydra . .	S.	4885	334 6	51 10	23 3	2	7000	St. Nazaire La Seyne .	1889 1900	..	11¾	13½	2½					
b.	Psara . . .	S.	4885	334 6	51 10	23 3	2	7000	Havre . . La Seyne .	1890 1897	..	11¾	13½	2½	3 10·6-in. Canet, 5 5·9-in., 1 3·9-in., 8 2·5-in., 4 1·8-in., 12 1·4-in.	3	17·0	600	400
b.	Spetsai . .	S.	4885	334 6	51 10	23 3	2	7000	Havre . . La Seyne .	1889 1900	..	11¾	13½	2½					

GREECE.—Cruising Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			Metric tons.	ft. in.	ft. in.	ft. in.	no.									knots.	tons.	
g.v.	Acheloos . .	S.	420	130 0	24 6	11 6	1	400	Blackwall .	1884	..	..	..	2 3·7-in. (K.), 3 M. . .	..	10·0	50	..
g.v.	Alphios . .	S.	420	130 0	24 6	11 6	1	400	Blackwall .	1884	..	..	..	2 3·7-in. (K.), 3 M. . .	..	10·0	50	..
g.v.	Eurotas . . .	S.	420	130 0	24 6	11 6	1	400	Dumbarton .	1884	..	..	..	2 3·7-in. (K.), 3 M. . .	..	10·0	50	..
corv.	Sfaktirea . .	S.	1000	216 6	29 3	18 0	1	2400	England .	1885	..	..	..	2 3·9-in. (K.), 2 M. . .	..	14·5	100	..

Torpedo depôt-ship.—Kanaris, 1100 tons, 500 I.H.P., 2 3·9-in. (Krupp) guns, 2 Whitehead torpedo-launching guns on broadside, 2 under-water torpedo tubes ahead; 14 knots speed. Gunboats, Ambrakia and Aktion, of 440 tons displacement, 380 horse-power, 10 knots speed, fitted with 1 10·2-in. Krupp gun and 2 machine guns; launched 1885; 4 gunboats, A. β. Γ. Δ. (52 tons, 1 4·7-in. Krupp), launched 1881; and 3 mining vessels (300 tons), launched 1881.

It is stated that three cruisers have been ordered from Italian firms.

Nauarchos Miaulis, 1800 tons, and Hellas, 1654 tons, training corvettes. Mykale, 1000 tons, transport. The old gunboats Paralos, Pinios, Plixaura, Salaminia, and Syros have little value.

ITALY.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour.			Armament.		Speed.	Normal Coal Supply.	Complement.
															Belt.	Gun Position	Deck Plating.	Guns.	Torpedo Tubes.			
			Metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	inches.	inches.	ins.			knots.	tons.	
t.	**Affondatore**	I.	4062	290	0	40	0	20	0	1	3240	Millwall	1865	197,600	5	5	2	2 28-ton (A.), 6 4·7-in. Q.F., 2 2·9-in., 4 2·2-in., 4 1·4-in., 2 M.	2	12·0	460	303
,,	**Ammiraglio di St. Bon**	S.	9800	344	6	69	4	24	9	2	13,500	Venice	1897	..	9¾–4 H.S.	9¾ H.S.	3-1½	4 10-in., 8 6-in. Q.F., 8 4·7-in., 2 2·9-in., 8 2·2-in., 12 1·4-in., 2 M.	4	18·0	600	548
c.d.s.	**Ancona**	I.	4460	256	0	50	0	25	0	1	2548	Bordeaux	1864	172,000	4½	4½	..	6 6-in. Q.F., 6 4·7-in., 2 2·9-in., 8 2·2-in., 12 1·4-in., 2 M.	3	12·0	485	423
b.	**Andrea Doria**	S.	11,000	328	2	65	4	27	2	2	10,500	Spezia	1885	765,500	18 *comp.*	18 *comp.*	3	4 105-ton (A.), 2 6-in. 4 4·7-in. Q.F., 2 2·9-in., 10 2·2-in., 17 1·4-in., 2 M.	5 (2 sub.)	16·1	850	526
b.	**Benedetto Brin**	S.	13,427	426	6	78	2	27	4	2	19,000 B.	Castellamare	1901	..	6 H.S.	10 H.S.	3	4 12-in., 4 8-in., 12 6-in. Q.F., 16 3-in., 8 1·8-in., 4 M.	4 (sub.)	19·5	1000 2000	719
a.c.	**Carlo Alberto**	S.	6500	325	0	59	0	22	11	2	13,220 (*t*)	Spezia	1896	..	6 H.S.	6 H.S.	1½	12 6-in. Q.F., 6 4·7-in., 2 2·9-in., 10 2·2-in., 10 1·4-in., 2 M.	4	19·2 (*t*)	1000	500
a.c.	**Castelfidardo**	I	4250	256	0	50	0	21	11	1	3070	St. Nazaire	1863	233,000	4½	4½	3-1½	6 6-in. Q.F., 6 4·7-in., 2 2·9-in., 8 2·2-in., 12 1·4-in., 2 M.	3	12·0	485	423
t.	**Dandolo** *	I & S	11,202	340	11	64	9	26	7	2	8045	Spezia	1878 1898	872,640	21½	18	2	4 10-in. (A.), 7 6-in. Q.F., 5 4·7-in., 2 2·9-in., 10 2·2-in., 14 1·4-in., 2 M.	4	15·6	732	506
t.	**Duilio**	I & S	11,138	340	11	64	9	26	7	2	7710	Castellamare	1876	850,400	21½	18	2	4 100-ton M.L.R. (A.), 3 4·7-in. Q.F., 2 2·9-in., 8 2·2-in., 22 1·4-in., 2 M.	3	15·0	1000	487
t.	**Emanuele Filiberto**	S.	9800	344	6	69	4	24	9	2	13,500	Castellamare	1897	..	9¾–4 H.S.	9¾ H.S.	3-1	4 10-in., 8 6-in. Q.F., 8 4·7-in., 2 2·9-in., 8 2·2-in., 12 1·4-in., 2 M.	4	18·0	600	536
b.	**Francesco Morosini**	S.	11,000	328	2	65	4	27	2	2	9560	Venice	1885	770,680	18 *comp.*	18 *comp.*	3	4 105-ton (A.), 2 6-in., 4 4·7-in. Q.F., 2 2·9-in., 10 2·2-in., 17 1·4-in., 2 M.	5 (2 sub.)	17·0	850	509
a.c.	**Francesco Ferruccio**	S.	7350	344	0	59	9	23	4	2	13,500 Nic.	Venice	1902	..	6 H.S.	6 H.S.	1½	1 10-in., 2 8-in. Q.F., 14 6-in., 10 2·9-in., 6 1·8-in., 2 M.	4 (sub.)	20·0	655 1200	540
a.c.	**Giuseppe Garibaldi**		7410								14,713 (*t*) Nic.	Sestri-Ponente (Ansaldo)	1899									

* New armament given. The reconstruction of the Duilio is not likely to be proceeded with.

ITALY.—Armoured Ships—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position	Armour. Deck Plating.	Armament. Guns.	Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.				£	inches.	inches.	inches.			knots.	tons.	
b.	Italia*	S.	14,387	400 6	74 0	31 2	2	11,986 (*t*)	Castellamare	1880	1,167,680	16 funnel op'nings	19 *comp.*	3	4 100-ton (A.), 8 6-in., 4 4·7-in. Q.F., 12 2·2-in., 24 1·4-in., 2 M.	4	18·0	1200	748
b.	Lepanto	S.	14,400	400 6	74 0	31 2	2	15,800 (*t*)	Leghorn (Orlando)	1883	1,150,880	16 funnel op'nings	19 *comp.*	3	4 100-ton (A.), 8 6-in., 4 4·7-in. Q.F., 12 2.2-in., 34 1·4-in., 2 M.	4	18·38	1650	748
a.c.	Marco Polo	S.	4583	327 0	48 3	19 6	2	10,543 (*t*)	Castellamare	1890	344,400	4	4	1	6 5·9-in. Q.F., 10 4·7-in., 2 2·9-in., 9 2·2-in., 4 1·4-in., 2 M.	5 (1 sub.)	19·0	600	394
a.c.	Maria Pia	I.	4268	256 0	49 4	22 7	1	2243	La Seyne	1863	215,000	$4\frac{1}{2}$	$4\frac{1}{2}$	..	8 5·9-in., 6 4·7-in. Q.F., 2 2·9-in. 10 2·2-in. 10 1·4-in., 2 M.	3	12·0	485	423
b.	Regina Elena	S.	12,621	435 6	73 6	27 3	2	20,000	Spezia	Bldg.	1,000,000	$9\frac{3}{4}$ H.S.	8 H.S.	4	2 12-in., 12 8-in., 12 3-in Q.F., 12 1·8-in.	4	22·0	1000 / 2000	..
b.	Regina Margherita	S.	13,427	426 6	78 2	27 4	2	19,000 Nic.	Spezia	1901	..	6 H.S.	8 H.S.	3	4 12-in., 4 8-in., 12 6-in. Q.F., 16 3-in., 8 1·8-in., 4 M.	4 (sub.)	19·5	1000 / 2000	719
b.	Re Umberto	S.	13,825	400 0	76 9	28 6	2	19,500	Castellamare	1888	1,058,500	4	18	3	4 67-ton (A.), 8 6-in. Q.F., 16 4·7-in., 2 9-in., 15 2·2-in., 14 1·4-in., 2 M.	8	19·0	1200	785
b.	Ruggiero di Lauria	S.	11,000	328 2	65 4	27 2	2	10,600	Castellamare	1884	777,560	18 *comp.*	18 *comp.*	3	4 105-ton (A.), 2 6-in. 4 4·7-in. Q.F., 2 2·9-in, 10 2·2-in., 17 1·4-in., 2 M.	5 (2 sub.)	17·0	910	509
a.c.	San Martino (training service)	I.	4268	256 0	49 4	22 7	1	2620	La Seyne	1863	213,880	$4\frac{1}{2}$	$4\frac{1}{2}$	..	8 5·9-in., 6 4·7-in. Q.F., 2 2·9-in., 10 2·2-in., 10 1·4-in., 2 M.	3	12·0	490	423
b.	Sardegna	S.	13,860	411 0	76 9	28 6	2	19,650 (*t*)	Spezia	1890	1,057,440	4	$14\frac{1}{4}$ *comp.*	3	4 67-ton (A.), 8 5·9-in. Q.F., 16 4·7-in., 2 2·9-in., 20 2·2-in., 10 1·4-in., 2 M.	5	20·1 (*t*)	1200	785
”	Sicilia	S.	13,375	400 0	76 9	28 6	2	19,500	Venice	1891	1,050,000	4	18 *comp.*	3	4 67-ton (A.), 8 5·9-in. Q.F., 16 4·7-in., 2 2·9-in., 20 2·2-in., 10 1·4-in., 2 M.	5	19·2	1200	785
a.c.	Varese	S.	7400	344 6	59 9	23 9	2	13,500 B	Leghorn (Orlando)	1899	..	6 H.S.	6 H.S.	$1\frac{1}{2}$	1 10-in., 2 8-in. Q.F., 14 6-in., 10 2·9-in., 6 1·8-in, 2 M.	4	20·0	650 / 1200	500
b.	Vittorio Emanuele III. / Roma and 2 unnamed†	S.	12,624	435 6	73 6	27 3	2	20,000	Castellamare	Bldg. / Pro.	1,000,000	$9\frac{3}{4}$ H.S.	8 H.S.	4	2 12-in., 12 8-in., 12 3-in. Q.F., 12 1·8-in.	4	22·0	1000 / 2000	..
a.c.	Vettor Pisani	S.	6500	325 0	59 0	22 11	2	13,000	Castellamare	1895	..	6 H.S.	6 H.S.	$1\frac{1}{2}$	12 6-in. Q.F., 6 4·7-in., 2 2·9-in. 10 2·2-in., 10 1·4-in., 2 M.	5	20·0	600	504

* The Italia is undergoing reconstruction.

† Estimates 1902–3—to be laid down.

ITALY.—Cruising Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour: Gun Position.	Armour: Deck.	Armaments: Guns.	Armaments: Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	in.			knots.	tons.	
to.cr .	Agordat . . .	S.	1313	287 6	30 6	11 1	2	8000	Castellamare .	1899	..	..	1	4 4·7-in. Q.F., 8 2·2-in., 2 1·4-in.	2	22·0	160	158
3rd cl. *cr.*	Amerigo Vespucci (training)	S.	2795	255 11	42 7	17 0	1	3310	Venice .	1882	176,300	..	¾	4 4·7-in., 1 3-in., 4 2·2-in., 4 1·4-in., 4 M.	2	14·0	500	265
g.v. .	Andrea Provana	S.	733	167 4	26 3	10 2	1	1080	Leghorn . (Orlando)	1884	39,760	..	..	4 1·7-in., 3 1·4-in. Q.F. .	.	13·0	120	103
d.v. .	Archimede . .	S.	784	230 0	26 3	10 0	1	1401	Venice .	1887	60,120	..	..	4 4·7-in., 2 2·2-in. Q.F., 2 1·4-in.	2	16·0	210	109
to.g.b. .	Aretusa .	S.	846	230 0	26 10	11 9	2	4420	Leghorn . (Orlando)	1891	72,920	..	1	1 4·7-in., 6 2·2-in., and 3 1·4-in.	6	20·7	120	111
3rd cl. *cr.*	Calabria . .	S.	2442	249 4	42 0	16 7	2	4091 *t.*	Spezia .	1894	183,120	..	2	4 5·9-in. Q.F., 6 4·7-in., 1 2·9-in., 8 2·2-in., 8 1·4-in., 2 M.	2	16·4 *t.*	500	257
to.g.b. .	Calatafimi .	S.	810	229 6	27 0	10 2	2	4136	Castellamare	1893	72,920	..	1	1 4.7-in. Q.F., 6 2·2-in., 3 1·4-in.	6	20·0	120	111
,, .	Caprera .	S.	853	230 0	27 4	10 2	2	4189	Leghorn . (Orlando)	1894	72,920	..	1	2 4·7-in. Q.F., 4 2·2-in., 2 1·4-in. Q.F.	5	21·0	120	111
to.cr. .	Coatit . .	S.	1313	287 6	30 6	11 1	2	8000	Castellamare	1899	..	..	1	4 4·7-in. Q.F., 8 2·2-in., 2 1·4-in.	2	22 0	160	158
to.g.b. .	Confienza .	S.	768	230 0	25 6	9 0	2	1887	Spezia .	1887	61,480	..	1	1 4·7-in. Q.F., 6 2·2-in., 2 1·4-in.	4	17·0	180	111
3rd cl. *cr.*	Cristoforo Colombo .	S.	2757	249 0	36 0	17 6	..	2321	Venice .	1892 Reblt	157,240	..	..	6 4 7-in., 2 2·2-in. Q.F., 4 1·4-in.	..	16·0	445	238
g.v .	Curtatone . .	S.	1292	177 3	32 8	13 6	1	1100	Venice .	1887	58,440	..	..	4 2·2-in., 2 1·4-in., 2 M.	..	12·0	197	131
3rd cl. *cr.*	Dogali .	S.	2088	250 0	37 0	14 6	2	7600	Elswick .	1887	156,040	4½	2	6 6-in. (A.), 1 2·9-in., 9 2·2-in. Q.F., 2 1·4-in., 2 M.	4	19·66	480	257
,,	Elba	S.	2730	272 6	40 8	16 7	2	7471 (*t*)	Castellamare	1893	200,000	4½	2	4 5·9-in. Q.F., 6 4·7-in., 1 2·9-in., 8 2·2-in., 8 1·4-in., 2 M.	2	17·9*t*	500	272

ITALY.—Cruising Ships—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour: Gun Position.	Armour: Deck.	Armament: Guns.	Armament: Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	in.			knots.	tons.	
2nd cl. *cr.*	Etna	S.	3530	282 2	42 7	19 0	2	6169	Castellamare	1885	226,720	5	1½	2 9·8-in. (A.), 6 5·9-in., 1 2·9-in., 5 2·2-in. Q.F., 8 1·4-in., 2 M.	4	17·8	630	315
to.g.b.	Euridice	S.	840	229 6	27 0	10 2	2	4162	Castellamare	1891	72,920	..	1	1 4·7-in. Q.F., 6 2·2-in., 3 1·4-in.	6	19·8*t*	120	111
3rd cl. *cr.*	Etruria	S.	2280	262 6	39 6	16 7	2	7585 (*t*)	Leghorn (Orlando)	1891	183,120	4½	2	4 5·9-in. Q.F., 6 4·7-in., 1 2·9-in., 8 2·2-in., 10 1·4-in., 2 M.	2	19·84	400	257
2nd cl. *cr.*	Fieramosca	S.	3600	290 0	43 6	19 4	2	7700	Leghorn (Orlando)	1888	240,120	5	1½	2 9·8-in., 6 6-in. Q.F., 1 2·9-in., 5 2·2-in., 8 1·4-in., 2 M.	4	17·5	450	315
cr.	Flavio Gioja (training)	S.	3064	255 11	42 7	17 0	1	4150	Castellamare	1881	193,920	..	1½	4 4·7-in., 1 3-in., 4 2·2-in. Q.F., 4 1·4-in., 4 M.	2	15·0	500	265
d.v.	Galilei	S.	900	230 0	26 3	8 2	1	1384	Venice	1887	56,720	..	..	4 4·7-in., 2 2·2-in. Q.F., 2 1·4-in.	2	15·0	210	109
3rd cl. *cr.*	Giovanni Bausan	S.	3068	275 7	42 7	18 4	2	6500	Elswick	1883	179,120	5	1½	2 9·8-in. (A.), 6 5·9-in., 1 2·9-in., 4 2·2-in. Q.F., 8 1·4-in., 2 M.	3 (1 sub.)	17·5	600	295
to.g.b.	Goito	S.	812	230 0	25 6	11 9	2	2620	Castellamare	1887	70,680	..	1	4 2·2-in. Q.F., 5 1·4-in.	5	19·0	130	111
g.v.	Governolo	S.	1255	185 0	33 9	13 9	1	1100	Venice	1894	58,440	..	..	4 4·7-in. Q.F., 4 2·2-in., 2 1·4-in., 2 M.	..	13·0	200	131
to.g.b.	Iride	S.	840	229 6	27 0	10 2	2	4242	Castellamare	1891	72,920	..	1	1 4·7-in. Q.F., 6 2·2-in., 3 1·4-in.	6	19·6	120	111
3rd cl. *cr.*	Liguria	S.	2280	262 6	39 4	16 9	2	7677 (*t*)	Sestri (Ansaldo)	1893	183,120	4½	2	4 5·9-in. Q.F., 6 4·7-in., 1 2·9-in., 8 2·2-in., 10 1·4-in., 2 M.	2	19·6*t*	430	257
„ „	Lombardia	S.	2380	262 6	39 6	16 7	2	6843 (*t*)	Castellamare	1890	183,120	4½	2	4 5·9-in. Q.F., 6 4·7-in., 1 2·9-in., 8 2·2-in., 8 1·4-in., 2 M.	2	17·0*t*	430	257
d.v.	Marcantonio Colonna	S.	656	216 6	23 11	10 10	1	1700	..	1879	51,480	..	..	5 2·2-in. Q.F., 2 M.	..	15·4	197	82
to.g.b.	Minerva	S.	846	246 0	27 6	11 9	2	4800 W.T.	Sestri (Ansaldo)	1892	72,720	..	1	1 4·7-in. Q.F., 6 2·2-in., 3 1·4-in.	5	21·0	120	111

to.g.b.	**Montebello**	S.	814	230	0 25	6 11	9 3	2776	Spezia	1888	74,120	..	1	6 2·2-in. Q.F., 2 1·4-in.	4	18·0	100	111
,,	**Partenope**	S.	840	246	0 27	6 11	9 2	4200	Castellamare	1890	71,000	..	1	1 4·7-in. Q.F., 6 2·2-in., 3 1·4-in.	5	19 0	100	111
3rd cl. *cr.*	**Piemonte**	S.	2500	300	0 38	0 15	0	12,000	Elswick	1888	220,000	3	3	6 6·6-in. Q.F., 6 4·7-in., 10 2·2-in., 6 1·4-in., 4 M.	3	21·0	560	325
3rd cl. *cr.*	**Puglia**	S.	2550	269	0 41	0 16	9 2	7000	Taranto	1898	200,000	4½	1	4 5·9-in. Q.F., 6 4·7-in., 1 2·9-in., 8 2·2-in., 8 1·4-in., 2 M.	2	20·0	650	257
d.v.	**Rapido**	I.	1568	262	5 30	6 12	6 1	1450	Leghorn (Orlando)	1876	77,400	..	..	5 2·2 in. Q.F., 2 M.	1	13·4	300	135
to.g.b.	**Saetta**	S.	400	187	0 19	8 6	7 2	2400	Castellamare	1887	38,880	..	..	2 2·2-in. Q.F., 4 1·4-in.	3	20·0	90	70
g.v.	**Scilla**	W.	1076	177	2 28	6 12	5 1	826	Castellamare	1874	65,520	..	..	4 2·2-in. Q.F., 2 M.	..	10·0	140	111
d.v.	**Staffetta**	I.	1806	252	7 30	10 13	2 1	1800	Sampierdarena (Ansaldo)	1876	82,600	..	..	4 4 7-in., 2 1·4-in. Q.F.	1	13·5	300	135
2nd cl. *cr.*	**Stromboli**	S.	3475	282	2 42	7 19	0 2	6298	Venice	1886	220,080	5	1·5	2 9·8-in. (A.), 6 5·9-in., 1 2·9-in., 5 2·2-in. Q.F., 8 1·4-in., 2 M.	4	17·0	600	315
to.g.b.	**Tripoli**	S.	848	230	0 25	10 11	9 3	2543	Castellamare	1886	72,080	..	1	7 2·2-in.	4	18·0	130	107
3rd cl. *cr.*	**Umbria**	S.	2280	262	6 39	6 16	7 2	7104 (*t*)	Leghorn (Orlando)	1891	183,120	4½	2	4 5·9-in. Q.F., 6 4·7-in., 8 2·2-in., 10 1·4-in., 1 l., 2 M.	2	18·83 (*t*)	430	257
to.g.b.	**Urania**	S.	846	230	0 27	0 11	2 2	4397	Sestri (Odero)	1891	72,920	..	1	1 4·7-in. Q.F., 6 2·2-in., 3 1·4-in.	6	20·0	120	111
2nd cl. *cr.*	**Vesuvio**	S.	3427	282	2 42	7 19	0 2	6820	Leghorn (Orlando)	1886	218,320	5	1·5	2 9·8-in., 6 5·9-in., 1 2·9-in., 5 2·2-in. Q.F., 8 1·4-in., 2 M.	4	17·0	600	315
g.v.	**Volturno**	S.	1174	177	3 32	8 14	4 1	1100	Venice	1887	58,960	..	..	4 4·7-in., 4 2·2-in. Q.F., 2 1·4-in., 2 M.	..	13·0	206	131

Subsidised auxiliary cruisers and despatch vessels.—Nord America, Vittoria, Duca de Galliera, and Duchessa di Genova (La Veloce S.S. Co.), Regina Margherita, Elettrico, Candia, Malta, Perseo and Orione (Navigazione Generale). The armament of these vessels is 2 2·2-in. Q.F., and 4 1·4-in. M. The gun vessels Castore and Pollnce (530 tons) have been converted into tank-ships, and their guns landed and placed in the forts at Taranto. Two coal transports of 8500 tons, carrying 6000 tons of coal, to be built by Orlando, at Leghorn.

JAPAN.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position	Armour. Deck Plating.	Armament. Guns.*	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.					inches.	inches	inches.			knots.	tons.	
b.	Asahi	S.	15,200	400 0	75 2	27 3	2	15,000 B	Clydebank	1899	..	9–4 H. S.	14–10 H. S.	4–2½	4 12-in., 14 6-in. Q.F., 20 12-pr., 8 3-pr., 4 2½-pr.	4 (sub.)	18	1400	..
a.c.	Asama	S.	9750	408 0	67 0	24 3 †	2	19,000 *t*	Elswick	1898	..	7–3½ H. S.	6	2	4 8-in. Q.F., 14 6-in. (A.), 12 12-pr., 7 2½-pr.	5 (4 sub.)	22·1 *t*	600 1200	..
a.c.	Azuma	S.	9436	445 10	59 6	28 0	2	17,000 B	St. Nazaire	1899	..	6	..	3	4 8-in., 12 6-in. Q.F. 12 3-in., 12 1·8-in.	5 (4 sub.)	..	..	482
b.	Chin-Yen (Ex. Chen Yuen)	S.	7400	308 5	59 0	20 0	2	6200	Stettin.	1882	..	14	12	3	4 12-in. (K.), 4 6-in. Q.F., 8 L., 8 M.	3	14	1000	250
a.c.	Chiyoda	S.	2450	308 0	42 6	14 0	2	5700 B	Clydebank	1889	..	4½	..	1–2	10 4·7-in. Q.F., 14 3-pr., 3 M.	3	17·5	420	300
b.	Fuji	S.	12,320	374 0	73 0	26 6	2	14,000	Thames	1896	..	18–6 H. S.	14 H. S.	2½ H. S.	4 12-in., 10 6-in. Q.F., 20 3-pr., 4 4½-pr.	5 (4 sub.)	19·2 18·5 *t*	1100	600
b.	Hatsuse	S.	15,000	400 0	76 6	27 0	2	16,300 B	Elswick	1899	..	9–4 H. N. S.	14–6 H. N. S	4	4 12-in., 14 6-in. Q.F., 20 12-pr., 8 3-pr., 4 2½-pr.	4 (sub.)	19·11 *t*	1100 1400	741
c.d.s.	Hei-Yen (Ex. Ping-Yuen-Go)	S.	2000	200 0	40 0	16 0	2	2400	Foo Chow	1890	..	8	5	2	1 10·2-in. (K.), 2 5 9-in., 6 M.	4	11·0	350	250
a.c. *a.c.*	Idzumo Iwate	S.	9750	400 0	68 6	24 3 †	2	17,300 B	Elswick	1899 1900	..	7–3½ H. N. S.	6 H. N. S.	2½	4 8 in. Q.F., 14 6-in., 12 12-pr., 8 2½-pr.	4 (sub.)	20·0	700 1600	672
b.	Mikasa	S.	15,200	400 0	76 0	27 2	2	15,000 B	Barrow	1900	..	9–4 H. N. S.	14–6 H. N. S.	3	4 12-in., 14 6-in. Q.F., 20 12-pr., 8 3-pr., 4 2½-pr.	(4 sub.)	18·6 *t*	700 1520	935
b.	Shikishima	S.	14,850	400 0	75 6	27 3 †	2	14,500 B	Thames	1898	..	9–4 H. N. S	14–6	3–5	4 12-in., 14 6-in. Q.F., 20 12-pr., 8 M.	5 (4 sub.)	18·5	700	741
a.c.	Tokiwa	S.	9750	408 0	67 0	24 3 †	2	20,000	Elswick	1898	..	7–3½ H. S.	6 H. S.	2	4 8-in. Q.F., 14 6-in. (A.), 12 12-pr., 7 2½-pr.	5 (4 sub.)	23·0	600 1200	500
a.c.	Yakumo	S.	9850	407 9	64 4	23 9	2	16,000 B	Stettin	1899	..	7–3½ H. S.	6 H. S.	2½	4 8-in. (A.) Q.F., 12 6-in, 12 12-pr. (A.), 7 2½-pr.	5 (4 sub.)	20·0	600 (1100)	500
b.	Yashima	S.	12,320	374 0	73 0	26 6	2	14,000	Elswick	1896	..	18–6 N. S.	14 N. S.	2½	4 12-in., 10 6-in. Q.F., 20 3-pr., 4 4½-pr.	5 (4 sub.)	19·2 18·5 *t*	1100	600

* All Q.F. guns and 12-in. for new ships are Armstrong. † Mean draught.

The old ironclads Hi-yei and Kon-go, of 2200 tons displacement, are now used as training ships; armament, 3 6·6-in. Krupps and 6 5·9-in.

The old central battery ironclad *Fu-So* (3718 tons) built on the Thames, 1877, and sunk off Shikoku Island, 1897, has been refloated and repaired.

JAPAN.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost	Armour. Gun position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	in.			knots.	tons.	
g.v.	Akagi	S.	615	164 0	27 0	10 0	1	700	Japan	1889	..	..	..	1 8·2-in., 1 5·9-in., 2 l., 2 M.	..	13·0	..	113
cr.	Akashi	S.	2700	306 9	40 0	16 4	2	8500	Yokosuka	1895	327,000	..	2–1	2 6-in. Q.F. (A.), 6 4·7-in., 12 3-pr., 4 M.	2	20·0	200	..
,,	Akitsushima	S.	3150	302 0	42 7	18 5	2	8400	Japan	1892	..	4½	3	4 6-in. Q.F., 6 4·7-in., 10 3-pr.	4	19·0	..	330
g.v.	Atago	S.	615	154 0	27 0	10 6	2	700	Japan	1887	..	..	..	1 8·2-in., 1 4·7-in., 2 M.	..	12·0	60	113
t.g.b.	Chihaya	S.	875	240 0	27 6	13 0	2	5500	Yokosuka	1900	..	..	..	2 4·7-in. Q.F., 4 3-pr.	5	21·0	200	..
cr.	Chitose*	S.	4760	396 0	49 0	17 7	2	Nor. 15,500	San Fr'cisco	1898	205,200	4½	4½–1¾	2 8-in. Q.F., 10 4·7-in., 12 12-pr., 2 6-pr., 2 2½-pr.	5	22·5	350 1000	405
,,	Hashidate	S.	4277	295 0	50 10	21 2	2	5400	Japan	1891	..	12	2	1 12·5-in. (Canet), 11 4·7-in. Q.F., 5 6-pr., 11 3-pr., 6 M.	4	17·0	400	350
,,	Itsukushima	S.	4277	295 0	50 10	21 2	2	5400	La Seyne	1891	..							
g.v.	Iwaki	W.	700	147 0	25 0	11 0	1	700	Japan	1883	..	..	..	1 5·9-in., 2 4·7-in.	..	10·0	600	115
,,	Idzumi (ex Esmeralda)	S.	2950	270 0	40 0	18 3	2	6500	Elswick	1878	..	22	5–1	2 10·2-in. (A.), 6 4·7-in. Q.F., 2 l. 6 M.	3	18·6	400	300
cr.	Kasagi	S.	5416	393 6	48 9	19 0	2	15,797	Philadelphia	1897	205,200	4½	4½–1¾	2 8-in., 10 4·7-in. Q.F., 12 12-pr., 6 1·8-in.	5	22·5	350 1000	405
t.c.	Katsuraki, Musashi	S.	1476	206 9	36 0	15 0	2	1600	Japan	1885	..	..	.	2 6-in. (K.), 5 4·7-in., 2 M.	2	13·0	..	242
g.v.	Maya	S.	615	154 0	27 0	10 0	2	700	Japan	1886	..	..	..	1 8·2-in., 1 4 7-in., 2 M.	..	13·0	60	113
cr.	Matsushima	S.	4277	295 0	50 10	21 2	2	5100	La Seyne	1890	.	12	2	1 12·5-in. (Canet), 11 4 7-in. Q.F., 5 6-pr., 11 3-pr., 6 M.	4	17·5	400	350
,,	Miyako	S.	1800	314 9	36 0	13 2	2	6130	Kure	Bldg.	..	..	..	2 4·7-in. Q.F., 10 1·8-in.	2	20·0	..	.

JAPAN.—Cruising Ships—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£	inches.	inches.			knots.	tons.	
cr.	Naniwa . . .	S.	3650	300 0	46 0	18 6	2	7235	Elswick .	1885	..	1½	3–2	2 10·2-in. (A.), 6 5·9-in. Q.F., 2 3-pr., 10 M.	4	18·72	800	350
cr.	Niitaka . . .	S.	3420	235 6	44 0	16 6	2	9400 Nic.	Yokosuka .	Bldg.	..	..	2½	6 6-in. Q.F., 10 3-in., 1 2½-pr.	..	20·0	600	..
g.v.	Oshima . . .	S.	630	164 0	27 0	10 0	1	700	Japan . .	1890	..	..	..	4 4·7-in., Q.F., 8 l. . . .	..	13·0	..	..
cr.	Sai yen (ex Tsi Yuen) .	S.	2300	263 3	33 0	15 9	2	2800	Stettin. .	1883	..	9	3	2 8·2-in., 1 5·9-in., 4 l. 10 M.	4	14·5	230	200
cr.	Suma . . .	S.	2700	306 9	40 0	16 4	2	8500	Yokosuka	1896	237,000	..	2–1	2 6-in. Q.F., 6 4·7-in., 12 3-pr., 4 M.	2	20·0	200	..
,,	Takao . . .	S.&W.	1774	230 0	33 0	13 0	2	2330	Japan . .	1888	..	..	..	4 6-in. Q.F., 1 4¾-in. do., 6 M.		15·0	300	255
,,	Takachiho . .	S.	3700	300 0	46 0	18 6	2	7500	Elswick .	1885	..	1½	3–2	2 10·2-in. (A.), 6 5·9-in., 2 3-pr., 10 M.	4	18·7	800	365
,, ,,	Takasago . . .	S.	4160	360 0	46 6	17 0	2	15,500 B	Elswick .	1897	..	4½	4½	2 8-in. Q.F., 10 4·7-in., 12 12-pr., 6 2½-pr.	5	23·0	800 / 1000	..
to.g.b.	Tatsuta . . .	S.	875	240 0	27 6	13 0	2	5500	Elswick .	1894	..	..	..	2 4·7-in. Q.F., 4 3-pdr. .	5	21·0	200	..
,,	Ten-riu . . .	W.	1500	200 0	32 0	16 5	1	1250	Japan . .	1882	..	..	..	1 6·6-in. (K.), 6 4·7-in., 2 l.	..	12·0	256	222
cr.	Tsukushi . . (*ex* Arturo Prat)	S.	1350	210 0	32 0	15 0	2	2887	Elswick	1882	..	4½	..	2 10-in. (A.), 4 4·7-in. Q.F., 2 l., 4 M.	2	16·5	250	190
,,	Tsushima . . .	S.	3420	235 6	44 0	16 6	2	9400 Nic.	Kure . .	Bldg.	..	..	2½	6 6-in. Q.F., 10 3-in., 4 2½-pr.	..	20·0	600	..
,,	Yayeyama . .	S.	1600	315 0	34 6	15 0	2	5400	Japan . .	1889	..	..	..	3 4·7-in. Q.F., 6 M. . .	2	20·0	..	200
,,	Yamato . . .	..	1476	206 9	36 0	15 0	1	1600	Japan . .	1885	..	..	..	2 6·6-in. (K.), 5 4·7-in., 4 M.	2	13·0	..	242
,,	Yoshino . . .	S.	4180	350 0	46 6	17 0	2	15,000	Elswick .	1892	..	4½	4½–1¾	4 6-in. Q.F., 8 4·7-in., 23 3-pr.	5	23·0	1000	300

The gunboats Chen-Pei, Chen Pien, Chen Nan, Chen Hsi, Chen Chung and Chen Tung (440 tons) were captured from the Chinese.

NETHERLANDS.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Turret.	Deck Plating.	Armament. Guns	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in	no				£	inches.	inches.	inches.			knots	tons.	
c.d.s.t.	Bloedhond	I.	1683	182	8	46	3	10	6	2	680	Amsterdam	1869	..	5½	9½	1	1 11-in. 28-ton (K.), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	7·7	104	118
„	Cerberus	I.	1584	185	8	44	0	9	9	2	534	Amsterdam	1869	..	5½	9½	1	1 11-in. 28-ton (K.), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	7·0	80	118
„	De Ruyter	S.	4950	316	10	51	6	21	8	2	6000 Y	Amsterdam	1900	347,500	6 H.N.S.	10 H.N.S.	2	2 9·4-in., 4 5·9-in. Q.F., 4 2·9-in., 8 1·4-in.	3 2 sub.	16·0	680	..
„	Draak	I.	2234	213	6	49	2	12	0	2	807	Amsterdam	1877	..	8	11	1	2 11-in (K.), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	8·0	100	133
„	Evertsen	S.	3400	282	9	47	0	16	9	2	4735	Flushing	1894	..	6 H.S.	9½ H.S.	2	3 8·2-in., 2 5·9-in., 6 2 9-in. Q.F., 8 1·4-in.	3	16·0	280	260
c.d.s.t.	Haai	I.	1580	195	2	44	0	9	6	2	672	Rotterdam	1871	..	5½	9½	1	1 11-in. 28-ton (K.), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	8·0	76	118
„	Heiligerlee	I.	1543	187	0	44	0	9	6	2	630	Birkenhead	1868	..	5½	9½	1	1 11-in. 28-ton (K.), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	9·0	120	118
„	Hertog Hendrik	S.	4950	316	10	51	6	21	8	2	6000 Y	Amsterdam	1901	347,500	6 H.N.S.	10 H.N.S.	2	2 9·4-in., 4 5 9-in. Q.F., 4 2 9-in., 8 1·4-in.	3	16·0	680	..
„	Hyena	I.	1580	192	2	44	0	9	6	2	654	Amsterdam	1870	..	5½	9½	1	1 11-in. 28-ton (K.), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	7·0	76	118
a.g.b.	Isala	I.	383	159	4	25	0	4	5	2	306	Amsterdam	1876	..	5	5	1	2 4·7-in. (K.)	..	7·7	28	44
t.	Koning der Nederlanden (I)	I.	5400	279	9	49	9	19	8	2	4500	Amsterdam	1874	..	7½	9½	⅔	4 11-in., 4 4·7-in., 2 2·9-in., 6 1·4-in., 4 1·4-in. Q.F.	..	12·0	520	308
c.d.s.t.	Koningin Regentes Nos. 4 & 5	S.	4950	316	10	51	6	21	8	2	6000 Y	Amsterdam	1900 Pro	347,500	6 H.N.S.	10 H.N.S.	2	2 9·4-in., 4 5·9-in. Q.F., 4 2·9-in., 8 1·4-in.	3 2 sub.	16·0	680	..
t. & b.	Koningin Wilhelmina der Nederlanden * (I)	S. shd.	4600	327	5	48	10	20	0	2	5900	Amsterdam	1892	..	..	11	3	1 11-in., 1 8·2-in., 2 6 6-in., 2 2·9-in., 4 2·9-in. Q.F., 4 1·4-in., 6 1·4-in. Q.F., 2 M.	4	16·5	418	274
c.d.s.t.	Kortenaer	S.	3100	282	9	46	11	16	9	2	4658	Amsterdam	1894	.	6 H.S.	9½ H.S.	2	3 8·2-in., 2 5·9-in., 6 2 9-in. Q.F., 8 1·4-in.	3	16·0	280	260
„	Krokodil	I.	1547	187	0	44	0	9	8	2	630	Birkenhead	1868	..	5½	9½	1	1 11-in. 28-ton (K.), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	9·0	120	118
„	Luipaard	I.	1610	191	9	44	0	9	7	2	680	Rotterdam	1876	..	5½	9½	1	1 11-in. 28-ton (K.), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	9·0	120	118

* Has received new engines and boilers.

NETHERLANDS.—Armoured Ships—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-Power.	Where Built.	Date of Launch.	Cost.	Armour.			Armament.		Speed.	Normal Coal Supply.	Complement.
															Belt.	Turret.	Deck Plating.	Guns.	Torpedo Tubes.			
			metric tons.	ft.	in.	ft.	in.	ft.	in	no.				£	inches.	inches.	inches.			knots.	tons.	
c.d.s.t.	Matador	I.	2000	209	6	47	3	10	6	2	691	Rotterdam	1878	..	5½	11	..	2 11-in. 28-ton (K.), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	7 5	100	130
a.g.b.	Merva	I.	383	159	4	24	11	4	5	2	395	Amsterdam	1879	..	5	5	1	2 4·7-in. (K.)	..	8·0	28	44
„	Mosa	I.	373	159	6	24	11	4	5	2	400	Amsterdam	1878	..	5	5	1	2 4·7-in. (K.)	..	8·0	28	44
c.d.s.t.	Panter	I.	1580	159	3	44	0	9	6	2	560	Amsterdam	1870	..	5½	9½	..	1 11-in. 28-ton (K.), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	7·0	76	118
c.d.s.t.	Piet-Hein	S.	3400	282	9	46	11	16	9	2	4736 *t*	Rotterdam	1894	..	6 n.s.	9½ n.s.	2	3 8·2-in., 2 5·9-in., 6 2·9-in., Q.F., 8 1.4-in.	3	16·2 *t*	280	260
t.	Prins Hendrik der Nederlanden	I.	3375	240	0	44	0	17	10	2	2000	Birkenhead	1866	..	4½	10	⅝	4 9-in. 13-ton M.L.R. (A.), 4 4·7-in. (K.), 2 2·9-in., 4 1·4-in. Q.F., 6 M.	..	11·0	380	228
t. & b.	Reinier Claeszen	S.	2479	229	5	44	4	15	0	2	350	Amsterdam	1891	..	4¾–2 *comp.*	11	3	1 8·2-in. (K.), 1 6·6-in., 1 2·9-in., 4 1·9-in. Q.F., 3 1·4-in.	2	12·5	88	160
a.g.b.	Rhenus	I.	388	160	5	25	0	4	6	2	310	Amsterdam	1877	..	5	5	1	2 4·7-in. (K.)	..	7·5	28	44
c.d s.t.	Schorpioen	I.	2235	205	0	38	0	16	6	2	2225	La Seyne	1868	..	6	11	1	1 11-in. 28-ton (K.), 2 2·9-in., 5 3-pr. Q.F., 2 M.	..	13·0	200	160
„	Stier	I.	2112	205	0	38	0	16	4	2	2250	Birkenhead	1868	..	11	8	1	1 11-in. 28-ton (K.), 2 2·9-in., 5 3-pr. Q.F., 2 M.	..	12·4	160	154
a.g.b	Vahalis	I.	365	126	0	27	9	5	3	2	240	Rotterdam	1870	..	4	1	½	2 3-pr. Q.F.	..	7·5	24	34
c.d.s.t.	Wesp	I.	1580	195	2	44	0	9	6	2	740	Amsterdam	1871	..	5½	9½	1	1 11-in. 28-ton (K.), 1 2·9-in., 2 3-pr. Q.F., 2 M.	..	8·0	76	118

NETHERLANDS.—Cruising Ships.

((I) denotes vessels of the Dutch Indian Navy.)

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	inches.	inches.			knots.	tons.	
cr	Atjeh	I. & W.	3410	301	0	41	0	21	4	1	2700	Amsterdam	1876	..	..	..	6 6·6-in. 6-ton, 8 4·7-in. (K.), 2 2·9-in., 8 3-pr. Q.F., 8 smaller.	..	13·5	440	301
g. v.	Bali (I)	I. & W. shd.	853	175	9	29	6	21	1	1	400	Rotterdam	1878	..	..	..	1 5·9-in., 3 4·7-in. (K.), 1 2·9-in., 2 1·4-in. Q.F.	..	9·0	80	104
,,	Bonaire	I. & W. shd.	853	175	6	29	6	12	7	1	412	Rotterdam	1877	..	..	..	1 5·9-in., 2 4·7-in. (K.), 1 2·9-in., 2 1·4-in. Q.F., 2 M.	..	9·0	104	84
,,	Borneo (I)	Cp. shd.	800	176	6	31	0	13	4	1	1040	Glasgow	1892	..	..	..	6 4·1-in., 1 2·9-in., 2 1·4-in. Q.F., 2 M.	..	13·0	124	106
,,	Ceram (I)	S. & W. shd.	550	173	2	25	7	10	3	1	800	Flushing	1887	..	..	..	3 4·7-in. (K.), 1 2·9-in., 2 1·4-in. Q.F.	..	12·5	70	82
,,	Condor (I)	Cp. shd.	350	126	0	20	0	10	0	1	300	Amsterdam	1885	..	..	..	1 2·3-in., 2 2-in.	..	10·0	26	40
g. v.	Edi (I)	S.	810	166	0	30	9	11	9	2	1100	Flushing	1897	..	..	..	3 4·7-in. Q.F., 2 2·9-in., 4 1·4-in.	..	13·0	113	95
,,	Flores (I)	S. & W. shd.	550	173	2	25	7	11	4	1	650	Amsterdam	1887	..	..	..	3 4·7-in., 1 2·9-in., 2 1·4-in. Q.F.	..	11·7	75	82
cr.	Friesland	S.	3900	294	0	48	6	17	8	2	10000 Y	Rotterdam	1896	285,700	..	2	2 5·9-in. Q.F., 6 4·7-in., 4 2·9-in., 8 1·4-in., 4 smaller.	4	19·8 t	400	306
cr.	Gelderland	S.	4033	310	8	48	6	17	8	2	10000 Y	Feijenoord	1898	..	..	2¼	2 5·9-in. Q.F., 6 4·7-in., 4 2·9-in., 4 1·4-in., 4 M.	4	20·0	850	..
cr.	Holland	S.	3900	294	0	48	6	17	8	2	10000 Y	Amsterdam	1896	285,700	..	2	2 5·9-in. Q.F., 6 4·7-in., 4 2·9-in., 8 1·4-in., 4 M.	4	19·6 t	400	306
g.v.	Java (I)	I. & W. shd.	1300	205	4	31	2	14	1	1	1050	Rotterdam	1885	..	..	..	1 5·9-in., 3 4·7-in., 1 2·9-in., 2 1·4-in. Q.F.	..	12·5	160	114
cr.	Koningin Emma der Nederlanden	I. & W. shd.	3528	301	0	41	0	21	4	1	2730	Amsterdam	1879	..	..	..	6 6·6-in. 6-ton, 8 4·7-in. (K.), 2 2·9-in., 8 3-pr. Q.F., 8 M.	..	14·0	470	301
g.v.	Lombok (I)	S. & W. shd.	600	172	0	27	3	11	0	1	990	Amsterdam	1891	..	..	..	3 4·7-in., 1 2·9-in., 2 3-pr. Q.F.	..	12·0	55	87
,,	Mataram (I)	S.	810	166	0	30	9	11	9	2	1100	Amsterdam	1896	..	..	..	3 4·7-in. Q.F., 2 3-in., 2 1·4-in.	..	13·0	113	95
,,	Nias (I)	S.	810	166	0	30	9	11	9	2	1227	Amsterdam (Huygens)	1895	..	..	..	3 4·7-in. Q.F., 2 2·9-in., 4 1·4-in.	..	13·0	120	95

NETHERLANDS.—Cruising Ships—*continued.*

((I) denotes vessels of the Dutch Indian Navy.)

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	inches.	inches.			knots.	tons.	
cr.	Noord-Brabant	S.	4033	299	0	48	6	17	9	2	10000 Y	Flushing	1899	..	..	$2\frac{1}{4}$	2 5·9-in. Q.F., 6 4·7-in., 4 2·9-in., 4 1·4-in., 4 M.	4	20·0	850	..
,,	Pelikaan (I)	S. & W. shd.	400	131	2	24	1	8	8	..	485	Rotterdam	1891	..	..	..	3 4·7-in. Q.F., 1 3 in., 2 3-pr. do.	..	11·35	43	40
,,	Serdang (I)	S	810	166	0	30	9	11	9	2	1160	Flushing	1897	..	..	..	3 4·7-in. Q.F., 2 2·9-in., 4 1·4-in.	..	13·0	113	95
sl.	Sommelsdijk	I. & W. shd.	1013	178	5	31	0	14	0	1	700	Amsterdam	1881	..	..	..	1 5·9-in., 3 4·7-in. (K.), 1 2·9-in.	..	10·0	150	88
cr	Sumatra (I)	S.	1720	229	6	37	0	14	0		3750	Amsterdam	1890	..	..	$1\frac{1}{2}$	1 8·2-in., 1 5·9-in., 2 4·7-in., 1 2·9-in., 4 3-pr. Q.F., 2 M.		17·0	225	183
g.v.	Sumbawa (I)	S	600	174	6	26	6	11	4	1	930	Flushing	1891	..	..	..	3 4·7-in., 1 2·9-in., 2 3-pr. Q.F.	..	12·5	60	87
,,	Suriname	I. & W. shd.	884	177	0	29	6	11	5	1	440	Amsterdam	1877	..	..	..	1 5·9-in. (K.), 2 4·7-in., 1 2·9-in., 2 1·4-in. Q.F., 3 M.	..	9·0	105	84
cr	Tromp.	I. & W. shd.	3512	301	0	41	0	21	4	1	2772	Amsterdam	1877	..	..	..	6 6·6-in. 6-ton, 8 4·7-in. (K.), 2 2·9-in., 6 3-pr. Q.F., 2 M.	..	14·0	470	301
cr.	Utrecht	S.	4033	310	8	48	6	17	8	2	10000 Y	Amsterdam	1898	..	..	$2\frac{1}{4}$	2 5·9-in. Q.F., 6 4·7-in., 4 2·9-in., 4 1·4-in., 4 M.	4	20·0	850	..
cr.	Van Speyk	I. & W. shd.	3728	302	1	41	0	23	0	1	2891	Amsterdam	1880	..	..	..	6 6·6-in. 6-ton, 8 4·7-in. (K.), 2 2·9-in., 6 3-pr. Q.F., 2 M.	..	14·0	360	301
cr.	Zeeland	S	3900	291	0	48	6	17	8	2	10589 Y *t*	Flushing	1897	285,700	..	2	2 5·9-in. Q.F., 6 4·7-in., 4 2·9-in., 8 1·4-in., 4 M.	4	19·4 *t*	400	306
g.v.	Zwaluw (I).	I. & W. shd.	340	126	0	20	0	10	0	1	240	Flushing	1882	..	..	..	2 3-in., 2 2-in.	..	10·0	26	40

Gun-vessels of the Indian Navy: Arend, Flamingo, Raaf, Reiger, Valk, Zeeduif, and Zwaan (400 tons), launched between 1880 and 1891; Glatik (417 tons), 1894; Argus and Cycloop (438 tons), 1893.

Sixteen Gunboats (*Staunch class*) of 268 tons, and of 100 to 171 H.P.; also *five small gunboats* of 210 tons, and 124 to 174 H.P., and *one steel gunboat* of 108 tons and 172 I.H.P. The new programme contemplates the building of three unarmoured monitors, 14 gunboats and three schooners.

Bellona (920 tons), gunnery training ship; Makasser (850 tons), surveying vessel.

NORWAY.—Armoured Ships.

Class.	NAME	Material of Hull.	Displacement.	Length.	Beam	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in	ft. in.	no.				£	in.	in.	in.			knots.	tons.	
c.d s.t.	Eidsvold .	S.	3847	290 0	50 6	16 6	2	4500 Y.	Elswick	1900	..	6	6	2	2 8·2-in., 6 5·9-in. Q.F., 8 12-pr., 6 3-pr.	2 sub.	16·5	400 600	261
	New Ship .									Bldg.		H.N.S.	H.N.S.						
,,	Mjölner .	I.	1515	203 5	45 11	11 10	1	450	Norrkoping	1868	66,800	5	12	1	2 4·7-in., 2 2·5-in. Q.F., 3 M., 1 l.	..	8·0	138	80
,,	Norge .	S.	3847	290 0	50 6	16 6	2	4500 Y.	Elswick	1900	.	6	6	2	2 8·2-in., 6 5·9-in. Q.F., 8 12-pr., 6 3-pr.	2 sub.	16·5	250	218
,,	Harald Haarfagre .	S.	3556	280 0	48 6	16 6	2	3700	Elswick	1896	190,000	H.S. 7	H.S. 8	2	2 8-in. Q.F., 6 4·7-in., 6 12-pr., 6 1½-pr.	2 sub.	17·2*	400 200	218
,,	Torkenskjold									1897		H.S.					t	500	
,,	Skorpionen .	I.	1447	200 2	45 11	11 6	1	350	Horten	1866	..	5	12	1	2 4·7-in., 2 2·5-in. Q.F., 3 M., 1 l.	..	6·0	138	80
,,	Thor .	I.	2003	203 5	49 3	13 2	1	600	Horten	1872	..	7	14¼	1	2 4·7-in., 2 2·5-in. Q.F., 3 M., 1 l.	..	8·0	200	90
,,	Thrudvang .	I.	1515	200 2	45 11	11 10	1	500	Horten	1867	..	5	12	1	2 4·7-in., 2 2·5-in. Q.F., 3 M., 1 l.	..	8·0	138	80

* Natural draught.

Cruising Ships.

Class.	NAME	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	in.			knots.	tons.	
g.b	Æger .	S.	393	108 6	29 6	8 0	2	450	Horten	1892	..	..	1½	1 8·2-in., 1 2·7-in. Q.F., 2 1·9-in.	..	9·0	..	..
g.v	Ellida .	W.	1000	187 0	32 8	14 4	2	900	Horten	1880	..	..	..	5 5·9-in. 4-ton (K.), 1 4·7-in., 1 l., 2 M.	1	12·0	97	128
,,	Frithjof .	S.	1371	216 6	32 10	13 3	2	300	Horten	1896	..	..	..	2 4·7-in., 4 2·9-in. Q.F., 4 1·4-in., 2 l.	3 1 sub.	..	..	..
,,	Heimdal .	S.	630	167 3	26 9	11 8	1	700	Christiania	1892	..	..		4 2 5-in. Q.F.	..	12·0	22	..
g.c.	Sleipner .	I.	580	173 10	25 11	9 6	2	800	Horten	1877	..	..	..	1 10·2-in. 22-ton (K.), 1 5·9-in. 4-ton do., 1 M.	1	12·0	80	87
to.g.b.	Valkyrien .	S.	380	190 0	24 2	9 2	2	3300	Elbing	1896	..	..	..	2 2·7-in. Q.F., 1 M.	2	23·2 t	..	..
g.v.	Viking .	S.	1113	203 6	30 6	13 0	2	2000	Horten	1891	..	..	1½	2 5·9-in. (A.), 4 2·5-in Q.F., 4 1·4-in., 2 M.	3	15·0	140	..

Eleven Gunboats, of 189 to 280 tons, and of 180 to 450 I.H.P., armed with one large gun and machine guns in each.
Sixteen smaller Gunboats, of 60 tons, 70 I.H.P., and 7½ knots speed; each armed with one 5½-inch gun. Also several smaller gunboats
A first-class gunboat, No. 4, of 395 tons, in hand. A despatch vessel, 850 tons, is to be laid down in 1902.

PORTUGAL.—Armoured Ship.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Battery.	Armour. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	inches.	inches.	inches.			knots	tons.	
c.b.	**Vasco da Gama** . .	I.	2422	200	0	40	0	18	0	2	3600	Blackwall .	1876	132,000	9	10	3	2 10·2-in. 18-ton (K.), 1 5·9-in., 2 2·5-in. Q.F., 2 M.	..	13·2	280	218

The Vasco da Gama is being reconstructed by Messrs. Orlando at Leghorn; she has been cut in two, and is to be lengthened 23 ft.

Cruising Ships.

Class.	NAME	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	in.	in.			knots.	tons.	
cr.	**Adamastor** . .	S.	1993	250	0	35	0	14	0	2	4000	Leghorn .	1896	..	5	3	2 5·9-in. Q.F., 4 4·7-in., 4 2 2-in., 4 M.	3	18·0 *t*	..	..
corv.	**Affonso de Albuquerque**	I. & W.	1111	203	0	33	0	13	6	1	1360	Blackwall .	1884	56,500	..	..	2 6-in (A.), 5 4·7-in., 2 2·5-in. Q.F., 2 M.	..	13·3	140	183
g.v.	**Bengo** . . .	I. & W.	462	125	6	24	6	9	0	1	400	Birkenhead .	1879	22,500	..	..	1 6-in., 2 3·4-in. . . .	..	10·0	80	88
„	**Diu**	W.	729	147	0	27	6	13	0	1	700	Lisbon .	1889	..	..	..	1 5·9-in. (K.), 2 4·7-in., 1 3 pr. Q.F., 2 M.	..	12·0	80	114
cr.	**Dom Carlos I.** . .	S. shd.	4100	360	0	46	6	17	6	2	12,500 Y	Elswick .	1898	..	..	4	4 5·9-in. Q.F. (A.), 8 4·7-in., 12 3-pr., 6 1-pr., 4 M.	5 (3 sub.)	22·0	1000	260

g.v.	**Dom Luiz I.** . .	S.	721	151	0 27	3 13	8	2	512	Lisbon .	1895	..	..	..	4 4·1-in., 3 2·5-in. Q.F., 3 M. .	..	9·9	100	..
„	**Douro**	W.	587	142	9 26	0 11	0	1	400	Lisbon .	1873 1877	..	..	..	1 5·9-in. 4-ton, 2 4·7-in., 1 M.	..	10·0	85	107
g.v.	**Liberal** . . .	I. shd.	580	140	0 25	6 10	6	1	580	Birkenhead .	1884	32,500	..	..	1 6-in. 4-ton (A.), 3 4-in.. 2 M.	..	11·0	90	109
corv.	**Mindello** . . .	C.	1124	170	0 35	9 14	0	1	900	Blackwall .	1876	74,500	..	..	2 7-in. 4-ton M.L.R. (A.), 4·47-in. 2 M.	..	11·5	130	169
g.v.	**Mandovi** . . .	I. shd.	462	125	6 24	6 9	0	1	400	Birkenhead .	1879	22,500	..	..	1 5·9-in., 2 3·4-in., 2 M. .	..	10·0	80	86
cr.	**Rainha Amelia** .	S.	1660	246	0 36	0 14	8	2	5000 Nor.	Lisbon .	1899	..	..	1	1 5·9-in. Q.F., 2 3·9-in., 2 3-pr., 4 M.	2	20·6	..	250
„	**Rio Lima** . . .	I. shd.	638	148	6 27	6 10	6	1	500	Birkenhead .	1875	33,000	..	..	1 7-in. 4-ton (A.), 4 4-in., 2 M.	..	11·0	100	109
„	**Sado**	C.	645	148	6 28	0 10	6	1	500	Birkenhead .	1875	35,500	..	..	1 7-in. 4-ton (A.), 4 4·7-in., 1 M.	..	11·0	100	109
cr.	**São Gabriel** . / **São Rafael** .	S. shd.	1800	246	0 35	6 14*	3	2	4000 N.S.	Havre .	1898	..	..	1½	2 5·9-in. Q.F. (Canet), 4 4·7-in., 8 1·8-in., 2 M.	1	17·5 *t*	500	..
g.b.	**São Salvador** . .	S.	721	151	0 27	3 13	8	2	..	Lisbon .	Bldg.	..	..	..	4 4·1-in., 3 5·2-in. Q.F., 3 M. .	..	11·0	100	..
„	**Tamega** . . .	C.	645	148	6 28	0 10	6	1	500	Birkenhead .	1875	35,500	..	..	1 7-in. 4-ton (A.), 4 4·7-in., 1 M.	..	11·0	100	109
to.g.b.	**Tejo**	S.	530	..	..	..	..		7000	Lisbon .	1901	..	..	..	1 3-in. Q.F., 6 1·8-in. . .	3	25·0	..	85
„	**Vouga** . . .	W.	730	160	9 27	6 12	0	1	600	Lisbon .	1882	..	..	..	4 4-in., 2 1 8-in. Q.F., 2 M. .	..	10·0	100	109
„	**Zaire**	I. shd.	580	140	0 25	6 10	6	1	580	Birkenhead .	1884	32,500	..	..	1 6-in. (A.), 3 4-in., 2 M. .	..	11·0	90	109
„	**Zambeze** . . .	W.	641	143	0 25	9 12	0	1	500	Lisbon .	1886	..	..	..	1 6-in. (A.), 2 4-in., 2 M. .	..	10·0	85	107
g.v.	One unnamed . .	S.	300	..	..	..	..		..	Lisbon .	Bldg.	..	..	..	.. .. ..	..	..	..	..

* Mean draught.

Fifteen small gunboats and about 29 light-draught steel *river-gunboats*. *Two gunboats* of 220 tons, the Al. Baptista de Andrade and Thomaz Andrea, are building for Mozambique and Timor

RUSSIA.—Armoured Ships.

(B.S., Black Sea Fleet.)

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position.	Armour. Deck Plating.	Armament. Guns. B.L.R. are of Russian Krupp pattern	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	in.	in.			knots.	tons.	
c.d.s., t.	Adm. Chichagoff	I.	3505	251 0	42 7	18 0	1	2060	St. Petersburg	1868	..		6	..	2 11-in. 28-ton, 4 4-pr., 6 Q.F., 4 l.	..	10·5	300	261
,,	Adm. Greig *	I.	3162	254 0	42 7	17 6	1	2031	St. Petersburg	1868	..	4½	6	..	3 11-in. 28-ton, 6 Q.F., 2 l.	..	10·0	300	280
,,	Adm. Lazareff	I.	3162	254 0	43 0	17 6	1	2004	St. Petersburg	1867	..	4½	6	..	3 11-in. 28-ton, 6 Q.F., 4 l.	..	10·25	300	280
a.c.	Adm. Nahimoff	S. shd.	8524	333 0	61 0	25 0	2	9000 B.	St. Petersburg	1885	572,000	10 comp.	8 comp.	3	8 8-in., 10 6-in., 10 Q.F., 4 3-pr., 6 M.	4	16·7	1200	567
b.	Adm. Boutakoff †	S.	5985	341 6	59 3	17 3	2	7000	St. Petersburg (New Admiralty)	1900 Bldg.	..	7	7–8	3	1 12-in., 2 8-in., 4 6-in. Q.F., 6 1·8 in., 8 M.	4 2 sub.	16·0	400	318
c.d.s.	Adm. Oushakoff	S.	4126	265 0	52 6	17 0	2	5000	St. Petersburg	1893	410,000	10	7–8	3	4 9-in., 4 6-in. Q.F., 6 1·8-in. Q.F., 8 M.	4	16·0	400	318
,,	Adm. Seniavin									1894									
c.d.s., t.	Adm. Spiridoff	I.	3505	254 3	42 7	19 1	1	2007	St. Petersburg	1868	..	6	6	..	2 11-in. 28-ton, 4 4-pr., 6 Q.F., 4 l.	..	10·5	300	260
b.	Alexander II.	S. shd.	9927	326 0	67 0	23 0	2	8000	St. Petersburg	1887	..	14 comp.	10 comp.	2½	2 12-in. 50-ton, 4 9-in. 19-ton, 8 6-in., 4 6-pr. Q.F., 4 3-pr., 6 M.	5	16·5	1200	604
b.	Alexander III. (Imperator)	S.	13,600	376 5	76 0	26 0	2	16,000 B.	St. Petersburg (Baltic)	1901	..	9–4 K.S.	6 K.S.	4	4 12-in., 12 6-in. Q.F., 20 3-in., 20 3-pr., 6 1 pr.	6 2 sub.	18·0	1250 2000	..
a.c.	Bayan	S.	7800	445 0	57 0	22 0	2	16,500 B.	La Seyne	1900	..	8–3 K.S.	6 K.S.	2	2 8-in., 8 6-in. Q.F., 20 2·9-in., 7 1·8-in.	2 sub	21·0	750 1100	..
b.	Borodino	S.	13,600	376 5	76 0	26 0	2	16,000 B.	St. Petersburg (New Admiralty)	1901	..	9–4 K.S.	5 K.S.	4	4 12-in., 12 6-in. Q.F., 20 3-in., 20 3-pr., 6 1-pr.	6 2 sub.	18·0	1250 2000	..
b.	Catherine II., B.S.	I.&S.	10,180	331 0	69 0	26 6	2	10,600 B.	Nicolaieff	1886	900,000	16 comp.	14 comp.	3	6 12-in. 56-ton, 7 6-in., 8 6-pr. Q.F., 6 M.	7	15·5	886	325
b.	Cesarevitch	S.	13,110	388 8	76 2	26 0	2	16,300 B	La Seyne	1901	..	9¾–8¾ K. S.	10–11 K. S.	2½	4 12-in., 12 6-in. Q.F., 20 3-in., 20 1·8-in., 6 1·4-in., 4 M., 2 l.	6 2 sub.	18·0	900 1350	..

c.d.s.	**Charodeika** . .	I.	1881	206	9	42	7	10	6	2	786	St. Petersburg.	1867	..	4½	6	1	4 9-in., 2 Q.F. and 2 M. .	..	8·0	250	171
a.c.	**Dmitri Donskoi** .	S. shd.	5882	296	5	52	0	24	4	2	7000	St. Petersburg.	1883	..	6	unard.	2½	6 6-in. Q.F., 10 4·7-in. Q.F., 16 Q.F. and M., 4 l.	4	16·5	400	510
t.	**Dvenadzat Apostoloff** (Twelve Apostles), B.S.	S.	8076	330	0	60	0	25	6	2	11,500	Nicolaieff .	1890	..	14 *comp.*	12 *comp.*	2½	4 12-in. 52-ton, 4 6-in., 8 3-pr. Q.F., 10 M.	6	16·6	800	500
a.c.	**General Admiral** .	I. shd.	4722	285	5	49	3	21	0	1	4472	St. Petersburg	1873	..	6	..	..	6 8-in., 2 6-in., 10 Q.F. and M., 5 l.	4	14·2	1000	312
c.d.s.	**General Admiral Apraxine**	S.	4200	277	6	52	6	17	6	2	5757 (*t*)	St. Petersburg (New Admiralty)	1896	..	10 H.S.	7·8	3	3 10-in., 4 6-in. Q.F., 6 1·8-in., 8 1·4-in.	4	15·0 (*t*)	215	318
a.c.	**Gertzog Edinburgski**	I. & W.	5050	285	5	49	3	21	0	1	5222	St. Petersburg	1875	..	6	6	..	4 8-in., 5 6-in., 12 Q.F., 6 l. .	2	15·2	1000	500
b.	**Georgi Pobiedonosetz** (George the Victorious), B.S.	S.	10,280	320	0	69	0	26	7	2	10,600 13,468 (*t*)	Sebastopol .	1892	431,000	16	12	..	6 12-in. 56-ton, 7 6-in., 8 3·9-in. Q.F., 6 M.	7	16·5	700	500
a.g.b.	**Gremiastchy** . .	S.	1500	225	0	41	0	11	0	2	2500 B.	St. Petersburg	1892	..	5	..	1½	1 9-in., 1 6-in., 10 Q.F. .	2	15·0	100	142
a.c.	**Gromoboi** . . .	S. d.	12,336	473	0	68	6	26	0	3	14,500	St. Petersburg (Baltic)	1899	..	6 H.S.	6 H.S.	3	4 8-in. Q.F., 16 6-in., 6 4·7-in., 20 3-in., 36 small Q.F. and M.	5 4 sub.	20·0	2500	..
a.g.b.	**Grozjastchy** . .	S.	1492	229	0	41	8	11	0	2	2000 B.	St. Petersburg	1890	..	5	..	1½	1 9-in., 1 6-in., 8 Q.F. .	2	15·0	100	120
,,	**Khrabry** . . .	S.	1492	229	0	41	8	11	0	2	2042 Nic.	St. Petersburg (New Admiralty)	1895	..	5	..	1½	1 9-in., 1 6-in., 8 Q.F. . .	2	15·0	100	120
c.b	**Kniaz Pojarski** .	I.	5138	272	4	49	3	23	11	1	2835	St. Petersburg	1867	..	4½	4½	..	2 8-in., 2 6-in., 10 Q.F. and M., 4 l.	..	11·0	600	452
t.	**Kniaz Potemkine Tavritchesky**, B.S.	S.	12,480	372	4	72	10	27	0	2	10,600 B.	Nicolaieff .	1900	..	10	11¾–9¾	2½	4 12-in., 16 6-in. Q.F., 4 4·7-in., 16 1·8-in., 14 1·4-in., 2 l.	5	17·0	900‡	636
b.	**Kniaz Souvaroff** .	S.	13,600	376	5	76	0	26	0	2	16,000 B.	St. Petersburg (Baltic)	Bldg.	..	9–4 H.S.	5 H.S.	4	4 12-in., 12 6-in. Q.F., 20 3-in., 20 3-pr., 6 1-pr.	6 2 sub	18·0	1250 2000	..
c.d.s., br.	**Kreml**	I.	3480	219	10	52	5	15	0	1	2822	St. Petersburg	1864	..	4½	4½	..	8 8-in., 6 6-in., 5 Q.F., 6 l. .	..	9·0	..	63
a.c	**Minin**	I.	6136	298	6	49	3	25	3	1	6000 B	St. Petersburg	1878 altd.	..	7	8	..	4 8-in., 12 6-in., 16 Q.F., 4 l.	..	14·0	1200	450
c.d.s., br.	**Netron-Menya** . .	I.	3194	219	10	53	0	15	6	1	1600	St. Petersburg	1861	..	4½	4½	..	14 8-in., 4 Q.F., 2 M., 4 l. .	1	9·0	500	63
t.	**Navarin** . . .	S	10,206	338	0	67	0	25	0	2	9000	St. Petersburg	1891	772,995	16	12	..	4 12-in., 8 6-in., 14 Q.F., 4 l.	6	16·0	1200	..

* To be fitted with new boilers. † Particulars doubtful. ‡ And liquid fuel.

RUSSIA.—Armoured Ships—*continued.*

(B.S., Black Sea Fleet.)

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position.	Armour. Deck Plating.	Armament. Guns. B.L.R. are of Russian Krupp pattern.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft.	in.	ft.	in.	ft.	in.					£	inches.	inches.	inches.			knots.	tons.	
t.	**Nicolai I.**	S. shd.	9672	326	0	67	0	23	0	2	8000 B.	St. Petersburg	1888 1900	453,000	14 *comp.*	10 tur. 6-in. b. *comp.*	2½	2 12-in. 52-ton, 4 9-in. 19-ton. 8 6-in., 12 Q.F., 8 M., 4 l.	6	14·8	..	604
cir. c.d.s.	**Novgorod, B.S.**	I. shd.	2706	101	0	101	0	13	0	6	2000	Nicolaieff	1873	..	9–7	9	..	2 11-in., 8 Q.F., 2 M., 2 l.	..	6·0	200	150
b.	**Orel**	S.	13,600	376	5	76	0	26	0	2	16,000 W.T.	St. Petersburg (Galerny)	Bldg.	..	9–4 K.S.	6 K.S.	4	4 12-in., 12 6-in. Q.F., 20 3-in., 20 3-pr., 6 1-pr.	6 2 sub.	18·0	1250 2000	..
t.	**Oslabya**	S.	12,674	401	3	71	6	26	0	3	14,500	St. Petersburg (New Admiralty)	1898	..	9½ H. S.	9 H. S.	2¾	4 10-in., 11 6-in. Q.F., 16 3-in., 10 1·8-in., 17 1·4-in., 2 l.	6	18·0	1063 2056	732
a.g.b.	**Otvazny**	S.	1500	225	0	41	0	11	0	2	2000 2589 (*t*) B.	St. Petersburg	1892	..	5	..	1½	1 9-in., 1 6-in., 10 Q.F.	2	15·0 15.5 (*t*)	100	142
a.c.	**Pamyat Azova** *	S. shd.	6675	377	0	51	0	23	0	2	8000	St. Petersburg	1888	350,000	9 *comp.*	8 *comp.*	2½	2 8-in., 13 6-in., 14 Q.F., and 3 M.	7	18·8	1000	525
t.	**Peresviet**	S.	12,674	401	3	71	9	26	0	3	14,500	St. Petersburg (Baltic)	1898	..	9½ H. S.	9 H. S.	2¾	4 10-in., 11 6-in. Q.F., 16 3-in., 10 1·8-in., 17 1·4-in., 2 l.	6	18 0	1063 2056	732
c.d.s., br.	**Pervenetz**	I.	3279	219	10	52	5	14	9	1	1067	Blackwall	1863	..	4½	4½	..	6 8-in., 9 6-in., 7 Q.F., 8 l.	..	9·0	..	63
t.	**Peter Veliky**	I.	9891	328	2	62	4	23	9	2	8258	St. Petersburg	1872	..	14–8	8–6	3	4 12-in. 40-ton, 13 Q.F., 4 l.	1	14·5	1200	436
t.	**Petropavlovsk**	S.	10,960	367	6	69	0	26	0	2	14,213 (*t*)	St. Petersburg	1894	1,098,000	15¾	10 H. S.	3½	4 12-in., 12 5·9-in. Q.F., 34 smaller.	6	16·3 *t*	900	..
t.	**Poltava**	S.	10,960	367	6	69	0	26	0	2	11,255 (*t*)	St. Petersburg	1894	1,098,000	15¾	10 H. S.	3½	4 12-in., 12 5·9-in. Q.F., 34 smaller.	6	16·2	900	..
b.	**Pobieda (Victory)**	S.	12,674	401	3	71	6	26	0	3	14,500 B.	St. Petersburg (Baltic)	1900	..	9½ H. S.	9 H. S.	2¾	4 10-in., 11 6-in. Q.F., 16 3-in., 10 1·8-in., 17 1·4-in., 2 l.	6	18·0	1063 2056	732

b.	**Retvizan**	S.	12,700	374	0	72	2	25	0	2	16,000 Nic.	Philadelphia	1900	..	9 K. S.	10 K. S.	4	4	12-in., 12 6-in. Q.F., 20 3-in., 20 3-pr., 6 1-pr.	..	18·0	1016 2000	..
a. c.	**Rossia**	S. shd.	12,130	480	0	68	6	26	0	3	14,500 B.	St. Petersburg	1896	..	10 H.S.	2 H.S.	2½	4	8-in., 16 6-in. Q.F., 12 3-in., 36 small Q.F. & M.	5	20·0	2500 ‡	725
t.	**Rostislav,** B.S.	S.	8880	341	0	66	6	24	0	2	8500	Nicolaieff	1896	..	15¾ *comp.*	15¾ *comp.*	2-3	4	10-in., 8 5·9-in. (Canet) 12 1·8-in. Q.F., 4 1·5-in., 2 M.	2–3	16·0	‡550 800	..
a. c.	**Rurik**	S.	10,923	396	6	67	0	26	0	2	13,250	St. Petersburg	1894	..	10 *comp.*	..	2½	4	8-in., 16 6-in., 6 4·7-in. Q.F., 18 small Q.F. & M.	5	18·0	2000	768
t.	**Sevastopol**	S.	10,960	367	6	69	0	26	0	2	13,600	St. Petersburg	1895	1,098,000	15¾	10 H.S.	3½	4	12-in., 12 5.9-in. Q.F., 34 smaller	6	17·5	900	..
b.	**Sinope,** B.S.†	I. & S.	10,180	331	0	69	0	26	6	2	13,000 B.	Sebastopol	1887	900,000	16 *comp.*	14 *comp.*	3	6	12-in. 50-ton, 7 6-in., 8 Q.F., 6 M.	7	16·75	886	325
t.	**Sissoi Veliky** (Sissoi the Great)	S.	8880	341	0	66	6	24	0	2	8500	St Petersburg	1894	796,333	15¾ *comp.*	15¾ *comp.*	3	4	12-in., 6 6-in. Q.F., 12 1·8-in., 4 1·4-in., 2 M.	6	16·0	550	..
b.	**Slava**	S.	13,600	376	5	76	0	26	0	2	16,000 W.T.	St. Petersburg (Baltic)	Bldg.	..	9–4 K. S.	6 K. S.	4	4	12-in., 12 6-in. Q.F., 20 3-in., 20 3-pr., 6 1-pr.	6 2 sub.	18·0	1250/2000	
..	**Tchesmé,** B.S.	I. & S.	10,180	331	0	69	0	26	6	2	11,000	Sebastopol	1886	900,000	16 *comp.*	14 *comp.*	3	6	12-in. 50 ton, 7 6-in., 8 Q.F., 6 M.	7	15·0	886	325
„	**Tria Sviatitelia,** B.S. (Three Saints.)	S.	12,480	357	6	72	2	27	0	2	10,600	Nicolaieff	1893	..	18–16 H.S.	16 H.S.	3	4	12-in., 8 6-in. Q.F., 4 4-in., 4 7-in., 56 smaller Q.F. & M.	6 2 sub.	16·0 18·0 (*t*)	1000	582
circular c.d.s.	**Vice-Admiral Popoff,** B.S.	I. shd.	3590	120	0	120	0	13	5	6	3066	Nicolaieff	1875	..	16	16	..	2	12-in. 40-ton, 2 Q.F., 6 l.	..	8·0	250	453
a.c.	**Vladimir Monomach**	S. shd.	6061	296	6	52	0	24	0	2	7000	St. Petersburg	1882	..	6 *comp.*	..	2	5	8-in., 12 6-in., 18 Q.F. & M., 4 l.	2	15 2	400	550

* To receive Belleville boilers; and to be reconstructed. † To receive new boilers and undergo machinery repairs. ‡ And liquid fuel.

Ten old Monitors of 1566 tons have been removed from this list:—Uragan, Tifon, Streletz, Edinorog, Koldun, Lava, Bronenosetz, Latnik, Perun, and Vieschun; and one of 1461 tons—Smerch.

RUSSIA.—Cruising Ships, &c.

(B.S., Black Sea Fleet.)

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons	ft. in.	ft. in.	ft. in.	no.				£		ins.			knots.	tons.	
to.g.b.	Abrek	S.	535	212 2	24 10	9 0	2	4506 (t.)	Abo	1896	53,600	..	½	2 3-in. Q.F., 4 1·8-in.	2	21·2 (t.)	..	..
2nd cl. cr.	Admiral Korniloff	S.& W.	5000	351 0	48 6	20 0	2	9000	St. Nazaire	1887 1895	296,000	..	2½	2 8-in., 14 6-in., 6 1·8-in. Q.F., 6 1·4-in., 5 l.	6	17·5	1100	425
cr.	Afrika	I.	2590	285 5	39 4	17 1	1	1350	Chester, U.S.	1877	..	..	..	3 6-in., 6 Q.F., 4 M., 4 l.	..	13·0	975	257
cr.	Alma	S.	3200	347 10	41 6	16 0	3	18000 W.T.	St. Petersburg (Baltic)	Bldg.	..	..	2	6 4·7-in. Q.F., 8 1·8-in., 2 1·4-in., 3 M.	6	25·0	600	340
cr.	Unnamed	S	3200	..	..	..	..	..	Elbing	Bldg.								
cr.	Asia	I.	2500	269 0	36 0	16 5	1	1100	Philadelphia	1878	..	..	..	2 6-in., 5 Q.F., 6 M., 5 l.	..	13·0	750	260
cr.	Askold	S.	6100	426 6	49 3	20 4	3	24000 Schulz	Kiel (Germania)	1900	..	..	3	12 6-in. Q.F., 12 3-in., 8 1·8, 2 1·4 in., 2 M.	6 2 sub.	21·0	710 1100	500
cr.	Aurora	S.	6630	413 4	55 9	21 0	3	11610 B.	St. Petersburg (Galerny)	1900	..	..	2½	8 6-in. Q.F., 20 3-in., 8 1·4-in.	4	20·0	..	..
to g.b.	Bakan (Mining)	S. shd.	840	180 6	15 7	11 6	2	3800 B.	St. Petersburg (Baltic)	1896	..	..	..	4 Q.F.	..	12·0	..	..
g.v.	Bobr	S.	950	187 0	35 2	9 6	2	1150	Kretona	1884	43,000	..	..	1 9-in., 1 6-in., 5 Q.F., M., & 6 l.	..	12·0	..	..
cr.	Bogatyr	S.	6750	416 8	54 6	20 10	2	20500 Nor.	Stettin (Vulcan)	1900	..	5 N.S.	2¾	12 6-in. Q.F., 12 3-in., 6 1·8 Hotchkiss, 3 l.	6 2 sub.	23·0	720 1100	580
cr.	Boyarin	S.	3200	347 10	41 6	16 0	3	18000 B.	Copenhagen	1900	..	..	2	6 4·7-in. Q.F., 8 1·8-in., 2 1·4-in., 3 M.	6 1 sub.	25·0	600	334
to.g.b.	Captain Sacken, B.S.	S.	742	210 0	24 0	8 10	2	3100	Nicolaieff	1888	40,700	..	..	7 4·7 in. Q.F., 7 M.	6	18·5	97	120
g.v.	Chernomoretz, B.S.	S.	1224	210 0	35 0	11 1	1	2000	Nicolaieff	1889	40,000	..	..	2 8-in., 1 6-in., 7 Q.F. & M.	2	13·5	250	161
"	Coreetz	S.	1213	206 0	35 0	10 6	2	1500	Stockholm	1886	..	..	1½	2 8-in., 1 6-in., 2 Q.F., 4 l.	2	13·5	..	..
cr.	Diana	S.	6630	413 4	55 9	21 0	3	11610 B.	St. Petersburg (Galerny)	1899	..	..	2½	6 6-in. Q.F., 20 3-in., 8 1·4 in.	4	20·0	..	..
corv.	Djigit	I.& W.	1456	206 9	32 10	16 1	1	1700	St. Petersburg	1876	..	..	..	3 6-in., 8 Q.F. & M., & 4 l.	..	13·0	250	172
"	Donetz, B.S.	S.	1224	210 0	35 0	11 0	1	2000	Nicolaieff	1887	40,000	..	..	2 8-in., 1 6-in., 7 Q.F. & M.	2	13·5	250	161

to.g.b.	Gaidamak	S.	500	192	6 24	2 7	6 2	3000	Abo	1893	..	..	..	2 1·8-in. Q.F., 7 1·4-in., 10 M.	3	22·0	90	87
g.v.	Gilyak	S.	963	200	0 37	0 9	3 2	1000 B.	St. Petersburg (New Admiralty)	1897	..	2	..	1 4·7-in. Q.F., 5 3-in., 2 2·6-in., 4 1·8-in.	1	12·0	..	..
to.g.b.	Griden, B.S.	S.	400	192	6 24	2 7	6 2	3500	Nicolaieff	1893	66,600	..	..	2 1·8-in. Q.F., 7 1·4-in., 10 M.	3	22·0	90	60
cr.	Izumrud	S.	3200	347	10 41	6 16	0 3	11500 B.	St. Petersburg (Nevsky)	Bldg.	..	..	2	6 4·7-in. Q.F., 8 1·8-in., 2 1·4-in., 3 M.	6	25·0	600	340
cr.	Jemtchug																	
g.v.	Jermak	I.	706	154	3 26	3 11	2 1	125	St. Petersburg	1870	..	..	..	2 guns	..	..	..	..
cr.	Kagul	S.	6250	436	0 52	0 20	7 2	19500	Nicolaieff	Bldg.	..	..	..	12 6-in. Q.F., 12 3-in., 8 1·8-in.	5 2 sub.	23·0	720	..
cr.	Kalgoula*	..	3200	..	..	..	..	..	Nicolaieff	Bldg.	..	..	..	..	..	25·0	..	..
to.g.b.	Kazarsky, B.S.	S.	400	190	0 24	0 8	6 2	3500	Elbing	1890	32,500	..	..	9 1·8-in. Q.F. (Hotchkiss)	2	23·0	90	60
corv.	Kreisser	I. & W.	1653	206	9 32	10 16	1 1	1800	St. Petersburg	1875	..	..	..	2 6-in., 7 Q.F., 1 M., 4 l.	..	13·0	..	..
g.v.	Kubanetz, B.S.	S.	1224	210	0 35	0 11	0 1	1500 B.	Sebastopol	1888	40,000	..	..	2 8-in., 1 6-in., 7 Q.F.	2	13·8	250	161
to.g.b.	Lieutenant Ilyin	S.	714	230	0 24	0 8	10 2	3500	St. Petersburg	1887	40,150	.	..	7 3-pr. Q.F., 10 M.	7	20·1	97	120
g.v.	Mandjur	S.	1416	210	0 35	0 11	0 2	1400	Copenhagen	1886	..	..	1½	2 8-in., 1 6-in., 7 Q.F., M., & 4 l.	2	14·0	..	..
corv.	Nayezdnik	I. & W.	1334	206	9 32	10 14	0 1	1719	St. Petersburg	1878	..	..	..	3 6-in., 7 Q.F. & M., 4 l.	..	13·0	250	172
cr.	Novik	S.	3200	347	10 41	6 16	0 3	18000 T.S.	Danzig (Schichau)	1900	..	..	2	6 4·7-in. Q.F., 8 1·8-in., 2 1·4-in., 3 M.	6	25·0	600	340
cr.	Oleg	S.	3200	347	10 41	6 16	0 3	18000 T.S.	St. Petersburg (New Admiralty)	Pro.	..	..	2	6 4·7-in. Q.F., 8 1·8-in., 2 1·4 in., 3 M.	6	25·0	600	340
corv.	Oprichnik	S. & W.	1426	206	9 32	10 14	0 1	1268	St. Petersburg	1880	..	..	..	3 6-in., 7 Q.F. & M., 4 l.	..	13·0	230	172
cr.	Otchakoff	S.	6250	436	0 52	0 20	7 ..	19500	Sebastopol	Bldg.	..	..	..	..	..	..	..	..
cr.	Pallada	S.	6630	413	4 55	8 21	0 3	11610 B.	St. Petersburg (Galerny)	1899	..	..	2½	6 6-in. Q.F., 20 3-in., 8 1·4-in.	4	20·0	..	..
3rd cl. *cr.*	Pamyat Merkuriya, B.S.	I. & S.	3050	295	0 41	0 17	0 1	3000	Toulon	1880	..	..	..	6 6-in., 8 Q.F. & M., 4 l.	2	16·0	1100	200
sl.	Plastun	I. & W.	1255	206	9 32	10 14	0 1	1268	St. Petersburg	1879	..	..	..	3 6-in., 7 Q.F. & M., & 4 l.	..	13·0	250	172
to.g.b.	Posadnik	S.	462	192	6 24	2 7	6 2	3600	Elbing	1892	111,000	..	..	2 1·8-in. Q.F., 7 1·4-in., 3 M.	3	22·0	90	87

* Information doubtful.—Ed.

RUSSIA.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour: Gun Position.	Armour: Deck.	Armament: Guns.	Armament: Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.	no.				£	in.	in.			knots.	tons.	
corv.	Razboynik	I. & W.	1329	206 9	32 10	14 0	1	1786	St. Petersburg	1878	125,000	..	..	3 6-in., 7 Q.F. & M., & 4 l.	..	13·0	250	172
3rd cl. *cr.*	Rynda	S. shd.	3508	265 9	45 11	16 1	2	3000	St. Petersburg	1885	..	..	1½	10 6-in., 9 Q.F., M., & 4 l.	4	14·8	710	322
g.v.	Sivootch	S.	950	187 0	35 0	9 6	2	1125	Stockholm	1884	43,000	..	..	1 9-in., 1 6-in., 5 Q.F., M., & 6 l.	..	12·5	..	..
corv.	Strjelok	I. & W.	1343	206 9	32 10	14 0	1	1528	St. Petersburg	1880	..	..	..	3 6-in., 7 Q.F., M., & 4 l.	..	13·0	250	172
cr.	Svietlana	S.	3828	331 3	42 8	18 9	2	3828 B.	Havre	1896	..	4	2	6 5·9 Q.F. (Canet), 10 1·8-in.	4	20·2 (*t.*)	1000	..
g.v.	Teretz, B.S.	S.	1224	210 0	35 0	11 0	..	1500 B	Sebastopol	1888	40,000	..	..	2 8-in., 1 6-in., 7 Q.F. & M.	2	13·8	250	161
g.v.	Uraletz, B.S.	S.	1224	210 0	35 0	11 0	..	1500 B.	Sebastopol	1888	40,000	..	..	2 8-in., 1 6-in., 7 Q.F. & M.	2	13·8	250	161
cr.	Varyag	S.	6500	420 0	52 0	20 8	2	20000 Nic.	Philadelphia	1899	..	..	3 N.S.	12 6 in. Q.F., 12 3-in., 6 1·4 (Hotchkiss).	6 2 sub.	23·0	770	571
cr.	Vitiaz	S.	6375	414 0	52 5	20 8	2	20000 B.	St. Petersburg (Galerny)	Bldg.	..	..	2	12 6-in. Q.F., 12 3-in., 8 1·8-in.	5 2 sub.	23·0	1250 720	..
sl.	Vjestnik	I. & W.	1255	206 9	32 10	14 2	1	1268	St. Petersburg	1879	..	..	..	3 6-in., 7 Q.F. & M., & 4 l.	..	13·0	250	172
to.g.b.	Voevoda	S.	400	192 6	24 2	7 6	2	3600	Elbing	1892	111,000	..	..	2 1·8-in. Q.F., 7 1·4-in., 3 M.	3	22·0	90	87
to.g.b.	Vzadnik	S.	400	192 6	24 2	7 6	2	3000	Abo	1893	..	..	..	4 1 8-in. Q.F., 7 1·4-in., 10 M., & 1.	3	22·0	90	97
sl.	Zabiyaka	I.	1234	219 10	29 6	14 9	1	1194	Philadelphia	1878	..	..	..	6 Q.F., 4 M., 5 l	..	14·5	250	172
g.v.	Zaporojetz	S.	1224	210 0	35 0	10 0	2	1500	Nicolaieff	1887	40,000	..	..	2 8-in., 1 6-in., 7 Q.F. & M.	2	13·5	250	161
cr.	Two unnamed	S.	..	..	..	..	..	..	Windau. Libau	Bldg.	..	..	..	..	..	..	..	..

Baltic:—*Ten Gunboats* (*Staunch Class*), of 270 to 402 tons, 195 to 445 I.H.P., with 1 11-inch breech-loader, and 9 knots speed, and *two Gunboats* of about 180 tons and 7 knots speed. *Training Ships*, Bajan, Voin, Vierny, and Moriak. Ermach, very powerful ice-breaker. Black Sea:—*Twelve Steamers* (*Gun-vessels, Despatch-vessels, &c.*), 90 to 298 tons. *Imperial Yachts*, Standart, Polarnaia Svezda, Tsarevna, &c. Okean, *coal transport*, 12.000 tons, 18 knots, launched at Kiel, 1901. She will carry 4000 tons of coal, and steam 10,000 miles, with 800 tons as her own supply, at reduced speed; fitted with Thornycroft, Schulz, Yarrow, Belleville and Niclausse boilers for instructional purposes.

Auxiliary Steamers.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Speed.
			tons.	ft.	in.	ft.	in.	ft.	in.					
	BLACK SEA CO.													
Auxiliary Cruiser	Czar	S.	2340	319	0	37	0	23	6	1	350 nom.	Newcastle	1883	14
,,	Czarevna	,,	2340	319	0	37	0	23	6	1	350 nom.	,,	1883	14
,,	Czaritza	,,	2340	319	0	37	0	23	6	1	350 nom.	,,	1883	14
,,	Grand Duke Alexis	,,	2350	284	0	37	0	14	9	1	3500	Hebburn	1890	16
,,	Grand Duke Constantine	,,	2100	284	0	37	0	15	0	1	3500	,,	1891	16
,,	Grand Duke No. 1	,,	2400	288	0	37	0	15	0	1	2500	,,	Bldg.	14½
,,	Grand Duke No. 2	,,	2400	288	0	37	0	15	0	1	2500	,,	,,	14½
,,	Emperor Nicolas II.	,,	..	..		..		..		..	..	,,	1895	..
,,	Roumantzeff	,,	760	212	0	28	0	7	6	2	1000	,,	1894	13
	VOLUNTEER FLEET.													
,,	Ekaterinoslav	,,	10,500	440	0	49	6	24	0	2	3200	,,	1896	12
,,	Khabarovsk	I.	2700	265	0	36	0	14	6	2	1800	,,	1894	13
,,	Kherson*	S.	10,225	493	0	54	3	24	0	2	12,500 B	,,	1895	19½
,,	Kiev	,,	10,500	440	0	49	6	24	0	2	3200	Clydebank	1895	13
,,	Kostroma	I.	7975	360	0	42	0	23	6	1	2700	Hebburn	1888	14
,,	Moskva*	S.	11,700	508	0	58	0	25	0	2	12,500 B.	Clydebank	1898	20
,,	Nijni Novgorod	I.	7876	325	0	40	0	23	6	1	2000	Elswick	1891	11½
,,	Orel	,,	7990	445	0	48	0	23	6	2	10,000	Hebburn	1889	19
,,	Petersburg	,,	9252	460	0	52	0	24	0	2	11,000	,,	1894	19
,,	Poltava	S.	10,225	493	0	54	3	24	0	2	12,500	Dumbarton	Bldg.	19½
,,	Saratoff	,,	8556	462	0	50	0	24	0	2	10,000	Glasgow	1892	19
,,	Smolensk	,,	11,850	506	6	58	0	24	0	2	16,500 B.	Newcastle (Hawthorn)	1901	20
,,	Tamboff	,,	8640	385	0	45	0	24	6	1	2,500	Dumbarton	1893	12¾
,,	Vladimir	,,	10,500	440	0	49	6	24	0	2	3,200	,,	1895	12
,,	Voronej	,,	10,500	440	0	49	6	24	0	2	3,200	,,	1895	12
,,	Yaroslav	,,	8640	385	0	45	0	24	6	1	2,500	,,	1893	12¾

* Armament, 3 4·7-in. Q.F., 20 smaller.

SPAIN.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position	Armour. Deck Plating.	Armament. Guns	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in	ft.	in	ft.	in	no.				£	in.	ns.	ins.			knots.	tons.	
a.c.	**Cardenal Cisneros** *	S.	7000	347	10	61	0	21	10	2	15,000	Ferrol	1896	600,000	12	10½	2	2 11-in., 10 5·5-in. Q.F., 2 2·7-in., 4 2·2-in., 4 1·4-in., 2 M.	5	20·0	1200	500
a.c.	**Cataluña**	S.	7000	347	10	61	0	21	10	2	15,000	Cartagena	1900	600,000	12	10½	2	2 11-in., 10 5·5-in. Q.F., 2 2·7-in., 4 2·2-in., 4 1·4-in., 2 M.	5 sub	20·0	1200	484
a.c.	**Emperador Carlos V.**	S.	9235	380	0	67	0	25	0	2	18,500	Cadiz (Vea Murguia)	1895	734,000	2	10	6½	2 11-in. (Hontoria), 8 5·5-in. Q.F., 4 3·9-in., 2 2·7-in., 4 2·2-in., 6 M.	6	20·0	1200	535
br.	**Numancia**	I.	7305	314	10	55	9	25	3	1	3708	La Seyne	1863 1897	315,600	5½	5	..	4 8-in., 4 6·2-in., 10 5·9 in. Q.F.	2	8·0	1100	600
b.	**Pelayo**	S.	9900	330	0	66	0	24	11	2	9000 Nic.	La Seyne	1887 1897	..	17¾	19¼	4	2 12-5-in. 48-ton, 2 11-in. 38-ton, 9 5·5-in. Q.F., 6 smaller, 12 M.	7	16·0	800	600
a.c.	**Princesa de Asturias**	S.	7000	347	10	61	0	21	10	2	15,000	Carraca	1896	600,000	12	10½	2	2 11-in., 10 5·5-in. Q.F., 2 2·7-in., 4 2·2-in., 4 1·4-in., 2 M.	5	20·0	1200	500
c.s., t.	**Puig-cerda** (Monitor) (torpedo training)	I.	553	127	11	29	6	6	7	2	328	La Seyne	1874	..	4	4	9	1 6·2-in. (Palliser), 2 4·7-in. bronze smooth bores.	..	8·0	23	..
br.	**Vitoria** (training)	I.	7250	318	3	55	10	25	3	1	4500	Blackwall	1865	..	5½	5	..	4 8-in., 4 6·4-in., 10 5·9-in. Q.F., 4 1·8 in., 2 L., 6 M.	2	11·0	875	561

* Owing to defects of design or construction the bows of the cruiser are to be rebuilt.

SPAIN.—Cruising Ships.

Class.	NAME.	Material.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£		ins.			knots.	tons	
cr.	**Alfonso XII.**	S.	3090	278	10	42	7	16	5	1	4800	Ferrol	1887	..	..	..	6 6·2-in. (Hontoria), 2 2·7-in., 6 6-pr. Q.F., 4 3-pr., 5 M.	5	17·5	600	300
cr.	**Alfonso XIII.**	S.	5000	318	6	[illegible]0	6	20	0	2	11,000	Ferrol	1891	..	..	4½	4 7·8-in. (Hontoria), 6 4·7-in., 6 2·2-in. Q.F., 6 1·4-in., 3 M.	5	20·0	1200	276
cr.	**Aragon**	W.	3342	246	0	45	11	20	11	1	4400	Cartagena	1879	..	..	..	6 6·2-in. (Hontoria), 2 3·3-in. (K.), 4 2·9-in., 2 M.	2	14·0	470	300
g.b.	**General Concha**	I.	524	157	5	25	7	8	7	2	600	Ferrol	1883	..	..	..	3 4·7-in. (Hontoria), 2 Q.F., 1 M.	1	11·0	80	93
cr.	**Conde de Venadito**	I.	1130	210	0	32	0	12	6	1	1600	Cartagena	1888	..	..	..	4 4·7-in. (Hontoria), 2 2·7-in., 2 Q.F., 5 M.	2	14·0	220	130
to.g.b.	**Don Alvaro de Bazan**	S.	823	233	0	26	9	22	0	2	2500	Ferrol	1897	..	..	..	2 4·7-in. (Hontoria) Q.F., 4 1·6-in., 2 M.	4	19·0	..	110
to.g.b.	**Doña Maria de Molina**	S.	823	233	0	26	9	22	0	2	2500	Ferrol	1896								
to.g.b.	**Destructor**	S.	458	192	6	25	0	7	0	2	3800	Clydebank	1887	..	..	..	1 3·5-in., 4 6-pr. Q.F., 4 M.	3	22·56	104	55
cr.	**Estremadura**	S.	2030	290	0	36	0	14	0	2	7000 T	Cadiz	1900	..	..	2	8 4-in. Q.F. (Vickers), 4 2·2-in., 2 1·4-in., 1 L.	..	20·0	..	..
to.g.b.	**Filipinas**	S.	750	213	0	27	0	8	6	2	4600	Cadiz	1892	..	..	..	2 4·7-in. Q.F., 4 1·5-in., 4 M.	4 sub.	20·0	120	110
to.g.b.	**Galicia**	S.	571	190	0	23	0	10	4	2	2600	La Graña	1891	..	..	..	2 4·7-in. (Hontoria), 4 2·2-in. Q.F., 1 M.	2	19·0	106	80

SPAIN.—Cruising Ships—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	ins.	ins.			knots.	tons.	
g. v.	**General Lezo**	I.	524	157	5	25	7	8	6	2	600	Cartagena	1885	..	..	..	2 4·7-in. (Hontoria), 1 3·5-in., 2 Q.F., 1 M.	2	11·0	80	97
sl.	**Infanta Isabel**	I.	1130	210	11	32	2	12	5	1	1500	Cadiz	1885	..	..	..	4 4·7-in. (Hontoria), 2 2·7-in., 3 Q.F., 4 M.	2	14·0	220	130
sl.	**Isabel II.**	I.	1130	210	11	32	2	12	5	1	1500	Ferrol	1886								
cr.	**Isabel la Catolica**	S.	3500	..		..		..		..	..	Carraca	Bldg.	..	..	..	.. .. ..	..	..	..	..
cr.	**Lepanto**	S.	4826	318	6	50	6	20	0	2	12,000	Cartagena	1892	..	..	4¾	4 7·8-in. (Hontoria), 6 4·7-in. Q.F., 6 6-pr., 4 3-pr., 5 M.	5	20·0	1100	276
g.v.	**Magellanes**	I.	524	157	5	25	7	8	6	2	600	Cadiz	1885	..	..	..	3 4·7-in. (Hontoria), 3 M. ..	1	11·0	80	97
to.g.b.	**Marques de la Victoria**	S.	823	233	0	26	9	22	0	2	2500	Ferrol	1897	..	..	..	2 4·7-in. (Hontoria) Q.F., 4 1·6-in., 2 M.	4	19·0	..	110
cr.	**Marques de la Enseñada**	S.	1030	185	0	30	0	11	6	2	1600	Carraca	1890	..	..	2½	4 4·7-in. (Hontoria), 5 Q.F., 4 M.	4	15·0	160	164
g.v.	**Marques de Molins**	S.	571	190	0	23	0	10	4	2	2600	La Graña	1891	..	..	..	2 4·7in. (Hontoria), 4 2·2-in. Q.F., 1 M.	2	12·0	106	80
gr.	**Martin Alonzo Pinzon**	S.	571	190	0	23	0	10	4	2	2600	La Graña	1892								
cr.	**Navarra**	W.	3342	232	11	42	7	20	4	1	4400 Nic.	Ferrol	1881	..	..	..	4 5·9-in., 2 4·7-in., 2 3·4-in., 4 2·9-in., 4 M.	2	14·0	470	300

g.v.	Nueva España	S.	630	190	0 23	0 11	9	2	2600	Carraca	1889	..	..	..	2 4·7-in. (Hontoria), 4 2·2-in. Q.F.	2	14·0	106	91
g.v.	Rapido	S.	570	190	0 23	0 10	4	2	2600	Carraca	1891	..	..	..	2 4·7-in. (Hontoria), 4 2·2-in. Q.F., 1 M.	2	14·0	106	80
cr.	Reina Regente	S.	5372	337	0 52	6 19	9	2	6500 W.T.	Ferrol	Bldg	..	..	3	10 5·5-in. Q.F., 12 2·2 in., 2 1., 8 M.	3	20·0	..	..
cr.	Rio de la Plata*	S. shd.	1800	216	0 35	4 15	0	2	7100 N.S.	Havre	1898	..	..	1	2 5·5-in. Q.F., 4 3·9-in., 4 2·2-in., 6 M.	2	20·0	270	..
g.v.	Temerario	S.	570	190	0 23	0 10	4	2	2600	..	1889	..	..	..	2 4·7-in. (Hontoria), 4 2·2-in. Q.F., 1 M.	2	15·0	106	82
g.v.	Vincente Yanez Pinzon	S.	571	190	0 23	0 10	4	2	2600	La Graña	1891	..	..	..	2 4·7-in. (Hontoria), 4 2·2-in. Q.F., 1 M.	2	12·0	106	80

Fernando el Catolico, 500 tons, torpedo training ship.

* A sister vessel, the General Linares, is stated to be in hand.

SWEDEN.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position.	Armour. Backing. Deck Plating.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	inches.	inches.	inches.			knots.	tons.	
c.d.s., t.	Aeran	S.	3670	287	0	49	3	16	5	2	6000 Y.	Gothenburg	Bldg.	..	7 K.S.	$5\frac{3}{4}$–$7\frac{7}{8}$ K.S.	$1\frac{7}{8}$	2 8·2-in., 6 5·9-in. Q.F., 10 2·2-in., 2 1·4-in., 2 M.	2 sub.	16·5	370	..
a.g.b.	Berserk*	I.	460	130	3	26	3	8	3	2	155	Norrköping	1874	..	3	$16\frac{1}{2}$	$\frac{3}{4}$	1 4·7-in. Q.F., 2 2·2-in.	..	8·0	19	45
,,	Björn	I.	460	130	3	26	3	8	3	2	155	Norrköping	1874	..	$3\frac{3}{4}$	$16\frac{1}{2}$	$\frac{3}{4}$	1 9·4-in., 2 M.	..	8·0	19	45
c.d.s., t.	Dristigheten	S.	3500	285	1	48	7	16	1	2	5400 Y.	Gothenburg	1900	..	8 N.S.	8 N.S.	$1\frac{7}{8}$	2 8·2-in., 6 5·9-in. Q.F., 10 2·2-in., 2 M.	2 sub.	16·5	300	..
,,	Folke*	I.	460	130	3	26	3	8	3	2	155	Norrköping	1875	..	3	$16\frac{1}{2}$	$\frac{3}{4}$	1 9·4-in., 2 M.	..	8·0	19	45
,,	Gerda	I.	460	130	3	26	3	8	3	2	133	Stockholm	1873	..	3	$16\frac{1}{2}$	$\frac{3}{4}$	1 9·4-in., 2 M.	..	7·6	19	45
c.d.s., t.	Göta*	S.	3290	258	6	47	11	16	9	2	4750	Gothenburg	1890 1902	..	$11\frac{3}{16}$–$7\frac{13}{16}$	$11\frac{5}{8}$–$9\frac{5}{8}$	2	2 10-in., 4 6-in., 5 2·2 Q.F., 8 M.	3	16·0	240	150
a.g.b.	Hildur*	I.	460	130	3	26	3	8	3	2	133	Stockholm	1872	..	3	$16\frac{1}{2}$	$\frac{3}{4}$	1 9·4-in., 2 M.	..	7·6	19	45
c.d.s., t.	John Ericsson	I.	1500	199	10	45	3	12	2	1	380	Norrköping	1865	..	$4\frac{7}{8}$	$10\frac{5}{8}$	$1\frac{1}{16}$	2 6-in., 2 2·2-in. Q.F., 2 M.	..	7·5	112	80
,,	Loke	I.	1600	204	9	44	11	11	10	1	430	Norrköping	1871	..	$4\frac{7}{8}$	$17\frac{5}{8}$	1	2 9·4-in., 2 M.	..	8·5	112	75
c.d.s., t.	Manligheten	S.	3670	287	0	49	3	16	5	2	6000 Y.	Malmö	Bldg.	..	7 K.S.	$5\frac{3}{4}$–$7\frac{7}{8}$ K.S.	$1\frac{7}{8}$	2 8·2-in., 6 5·9-in. Q.F., 10 2·2-in., 2 1·4-in., 2 M.	2 sub.	16·5	370	..
,,	Njord	S.	3500	278	3	48	7	17	5	2	5350	Gothenburg	1898	..	9·5	$7\frac{7}{8}$	$1\frac{7}{8}$	2 9·8-in., 6 4·7-in. Q.F., 10 2·2-in., 4 M.	1	16·5	275	200
,,	Oden	S.	3500	278	3	48	7	17	6	2	5330	Stockholm	1896	..	9·5	$9\frac{7}{8}$–$7\frac{7}{8}$	$1\frac{7}{8}$	2 9·8-in., 4 4·7-in. Q.F., 10 2·2-in., 4 M.	1	16·5	275	200
a.g.b.	Sölve*	I.	460	130	3	26	3	8	3	2	155	Norrköping	1875	..	3	$16\frac{1}{2}$	$\frac{3}{4}$	1 9·4-in., 2 M.	..	8·0	19	45
c.d.s., t.	Svea*	S.	3100	248	4	49	3	17	1	2	3640	Gothenburg	1886	..	$11\frac{1}{2}$–$7\frac{3}{4}$	$11\frac{1}{2}$–$9\frac{1}{2}$	2	2 10-in. (A.), 4 4·7-in., 6 2·2-in., 8 M.	1	14·7	220	268
c.d.s., t.	Tapperheten	S.	3670	287	0	49	3	16	5	2	6000 Y.	Malmö	Bldg.	..	7 K.S.	$5\frac{3}{4}$–$7\frac{7}{8}$ K.S.	$1\frac{7}{8}$	2 8·2-in., 6 5·9-in. Q.F., 10 2·2-in., 2 1·4-in., 2 M.	2 sub.	16·5	370	..
,,	Thor	S.	3500	278	3	48	7	17	6	2	5350	Stockholm	1898	..	9·5	$7\frac{7}{8}$	$1\frac{7}{8}$	2 9·8-in., 6 4·7-in. Q.F., 10 2·2-in., 4 M.	1	16·5	275	200
t.	Thordön*	I.	1500	199	10	45	3	11	10	1	380	Norrköping	1866	..	$4\frac{5}{8}$	$10\frac{1}{4}$	1	2 9·4-in., 2 M.	..	6·7	112	80
c.d.s., t.	Thule*	S.	3300	260	10	47	11	16	9	2	4740	Stockholm	1892	..	$11\frac{1}{2}$–$7\frac{3}{4}$	$11\frac{1}{2}$–$9\frac{1}{2}$	$1\frac{7}{8}$	2 10-in. (A.), 4 6-in., 5 2·2 Q.F., 8 M.	2	16·2	250	165
,,	Tirfing*	I.	1500	199	10	45	3	11	10	1	380	Norrköping	1867	..	$4\frac{5}{8}$	$10\frac{1}{4}$	1	2 9·4-in., 2 M.	..	6·8	112	80
a.g.b.	Ulf*	I.	460	130	3	26	3	8	3	2	155	Norrköping	1873	..	$3\frac{3}{4}$	$16\frac{1}{2}$	$\frac{3}{4}$	1 4·7-in. Q.F., 2 2·2-in. Q.F.	..	8·0	20	45
c.d.s., t.	Wasa	S.	3670	287	0	49	3	16	5	2	6000 Y.	Stockholm	1901	..	7 K.S.	$5\frac{3}{4}$–$7\frac{7}{8}$ K.S.	$1\frac{7}{8}$	2 8·2-in., 6 5·9-in. Q.F., 10 2·2-in., 2 1·4-in., 2 M.	2 sub.	16·5	370	..

SWEDEN.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			metric tons.	ft.	in.	ft.	in.	ft.	in.	no.									knots.	tons.	
corr.	Balder	W.	1886	202	9	36	5	18	4	1	1380	Carlskrona	1870	..	..	..	1 6-in. (A.), 8 4·7-in., 2 1·5-in., 1 2·5-in., 5 M.	..	12·1	200	218
g.v.	Blenda	I.	500	167	8	25	11	9	10	2	590	Gothenburg	1874	..	..	..	1 10·6-in., 1 4·7-in., 2 M.	..	11·5	98	71
to.g.b.	Claes Horn	S.	800	222	1	26	11	10	2	2	3600	Stockholm	1899	..	..	..	2 4·7-in. Q.F., 4 2·2-in.	1 sub.	20·0	..	..
to.g.b.	Claes Uggla	S.	800	232	0	27	3	8	10	2	4500 Y.	Stockholm	Bldg.	..	..	..	2 4·7-in. Q.F., 4 2·2-in.	1 sub.	20·5	..	..
g.v.	Disa	I.	500	167	8	25	11	9	2	2	590	Carlskrona	1877	..	..	..	1 6-in., 1 4·7-in., 2 2·2-in., 2 M.	..	11·6	98	72
tor. ship.	Drott (ex Ran)	I.	630	175	2	25	11	9	10	2	960	Stockholm	1877	..	..	..	4 Engström Q.F.	1	13·0	100	..
g.v.	Edda	I.	640	183	9	26	11	10	2	2	960	Carlskrona	1885	..	..	..	1 10·6-in., 1 6-in., 2 1·5-in., 2 M.	..	13·6	80	76
corr.	Freja	S.&W.	2000	215	11	40	0	19	8	1	1750	Malmö	1885	..	..	..	4 6-in., 8 4·7-in., 4 1·5-in., 2 2·5-in., 5 M.	..	14·1	180	250
to.g.b.	Jacob Bagge	S.	800	222	1	26	11	10	2	2	3970	Malmö	1898	..	..	..	2 4·7-in. Q.F., 4 2·2-in.	1 sub.	19·5	..	..
,,	Örnen	S.	800	222	1	26	11	10	2	2	4100	Gothenburg	1896	..	..	..	2 4·7-in. Q.F., 4 2·2-in.	1 sub.	19·5	..	..
,,	Psilander	S.	800	232	0	27	3	8	10	2	4500 Y.	Stockholm	Bldg.	..	..	..	2 4·7-in. Q.F., 4 2·2-in.	1 sub.	20·5	..	..
g.v.	Rota	I.	536	171	3	25	3	10	10	2	780	Stockholm	1878	..	..	..	1 10·6-in., 1 4·7-in., 2 M.	..	13·0	80	72
corr.	Saga	W.	1530	200	6	34	5	17	1	1	900	Carlskrona	1878	..	..	..	1 6-in. (A.), 6 4·7-in., 1 M., 3 1.	..	11·2	170	189
g.v.	Skäggald	I.	536	171	3	25	11	9	10	2	780	Stockholm	1879	..	..	..	1 10·6-in., 1 4·7-in., 2 M.	..	13·2	80	72
,,	Skagul	I.	536	171	7	25	7	10	2	2	780	Stockholm	1878	..	..	..	1 6-in., 1 4·7-in., 2 2·2-in., 2 M.	..	13·1	80	72
,,	Skuld	I.	536	171	3	25	3	10	10	2	780	Carlskrona	1879	..	..	..	1 10·6-in., 1 4·7-in., 2 M.	..	13·0	80	72
,,	Urd	I.	536	172	3	25	7	10	6	2	780	Malmö	1877	..	..	..	1 6-in., 1 4·7-in., 2 2·2 Q.F., 2 M.	..	13·5	80	71
,,	Verdande	I.	536	171	7	25	7	10	2	2	780	Carlskrona	1879	..	..	..	1 10·6-in., 1 4·7-in., 2 M.	..	13·2	80	72

Four gunboats of 190 to 200 tons, and about 130 I.H.P. each, and carrying 1 5-in. B.L.R. and 2 M.; also one vessel of 280 tons and 440 H.P., armed with 4 Q.F. guns—the Svenskund, used as a mining and torpedo-ship and ice-breaker.

TURKEY.—Armoured Ships.

A number of ships have been struck out of these lists owing to information obtained from Constantinople. Of the remainder few have any fighting value.

Class.	NAME.	Material.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply	Complement.
			tons.	ft.	in.	ft.	in.	ft.	in.	no.					inches.	inches.	inches.			knots.	tons.	
c.	Assar-i-Shefket	I.	2080	203	5	42	7	16	5	2	1750	La Seyne	1868	..	6	5	..	1 9-in. (A.), 4 7-in., 4 M., 4 l.	..	11·0	375	220
c.b.	Assar-i-Tewfik *	I.	4687	272	4	52	6	24	11	1	3560	La Seyne	1868	..	8	6	..	2 9·2-in., 6 6-in. Q.F., 10 12-pr., 12 6-pr.	..	13·0	400	..
c.	Avni-Illah	I.	2400	226	4	36	0	16	5	1	2200	Thames	1869	..	6	6	1½	4 9-in. M.L.R. (A.), 4 M., 4 l.	1	12·0	220	225
b.	Azizieh	I	6100	292	0	55	9	25	7	1	3735	Clyde	1864	..	5½	4½	..	2 9·2-in. (K.), 8 8·2-in., 6 3·9-in., 7 M., 2 l.	2	13·0	750	600
c.b.	Feth-i-Bulend	I.	2806	236	3	39	4	18	1	1	3250	Thames	1869	..	9	9	5	4 9-in. M.L.R. (A.), 4 M., 4 l.	1	13·0	300	250
a.g.b.	Feth-el-Islam	I.	335	101	9	24	7	5	11	1	290	Gironde	1864	..	3	3	..	2 7-in. (A.), 2 l..	..	8·0	20	..
c.b.	Hamidieh	I.	6700	292	0	55	9	24	10	1	4500	Turkey	1885	..	9	5	3	10 10·2-in. (K.), 2 6·6-in., 6 l., 2 M.	2	13·0	600	..
b.	Mahmoudieh	I.	6400	292	0	55	9	25	7	1	3735	Thames	1864	..	5½	4½	..	2 9·2-in. (K.), 8 8·2-in., 6 3·9-in., 7 M.. 2 l.	2	12·0	750	600
c.b.	Messoudieh*	I.	9120	331	5	59	0	25	11	2	11,000 Nic.	Thames Genoa	1874 1901	..	12	6-9	1	2 9·2-in., 12 6-in. Q.F., 14 3-in., 10 6-pr., 2 3-pr., 2 l.	..	15·0	600	..
,,	Muin-i-Zaffer	I.	2400	230	0	36	0	16	5	2	2200	Thames	1869	..	6	6	1½	4 10-in. M.L.R. (A.), 1 4·7-in. (K.). 4 M., 4 l.	1	12·0	220	..
,,	Mukadim-i-Hair	I.	2806	236	3	39	4	18	1	1	3000	Turkey	1872	..	9	9	5	4 10-in. M.L.R. (A.), 1 4·7-in. (K.), 4 M., 4 l.	1	12·0	300	250
,,	Nedjim-i-Schefket	I.	2050	203	5	42	7	16	5	2	1900	La Seyne	1868	..	6	5	..	1 9-in, 4 7-in. (A.), 4 M., 4 l.	1	11·0	300	220
b.	Orkanieh	I.	6400	292	0	55	9	25	7	1	3735	Clyde	1865	..	5½	4½	..	2 9·2-in. (K.), 8 8·2-in., 6 3·9-in., 7 M., 2 l.	2	12·0	750	600
,,	Osmanieh	I.	6400	292	0	55	9	25	7	1	3735	Clyde	1864	..	5½	4½	..	2 9·2-in. (K.), 8 8·2-in., 6 3·9-in., 7 M., 2 l.	2	12·0	750	600

* The Messoudieh is in hand at Messrs. Ansaldo's yard, receiving new armament and machinery. The hull has been partially rebuilt to suit the new armament, and Messrs. Ansaldo have built the engines. Nothing appears to have been decided in regard to the Assar-i-Tewfik, which was sent to Kiel, or the other ships proposed to be reconstructed.

TURKEY.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Cost.	Date of Launch.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft. in.	ft. in.	ft. in.				£		in.	in.			knots.	tons.	
cr.	Fezibahri	S.	1815	226 0	35 0	14 0	2	2500	Turkey	..	Bldg.	..	½	6 6-in. (K.)	7	17·0	..	..
,,	Heibetnuma	S. & W.	1960	226 0	37 0	14 0	1	2500 ind.	Turkey	..	1890	..	..	3 6·6-in. (K.), 6 4·7-in., 6 Q.F.	2	14·0	..	..
,,	Hundavendikiar	S.	4050	279 0	49 3	21 0	2	..	Turkey	..	Bldg.	..	2	2 8·9-in. (K.), 6 5·9-in., 4 3·9-in.	5	..	..	300
g.v.	Lutfi-hamayoun	C.	1313	210 0	35 0	14 0	1	2800	Turkey	..	1892	..	..	4 6-in. (K.), 6 4·7-in. 6 Q.F.	2	13·0	..	..
to. g.b.	Namet	S.	900	230 0	31 0	16 6	2	4500	Gaarden	..	1890	¼	..	2 4-in. (K.), 16 M.	2	19·0	..	111
,,	Pelenk-i-deria	S.	840	236 3	31 0	16 6	2	5000	Gaarden	..	1890	¼	..	2 4-in. (K.), 16 M.	2	20·0	..	111
g.v.	Sedul Bahr	W.	800	173 6	26 7	11 6	1	160	Turkey	..	1894	..	2	4 4·7-in. (K.), 6 M.	2	12·7	120	..
cr.	Selimieh	S.	4050	279 0	49 3	21 0	2	..	Turkey	..	Bldg.	..	½	2 8·2-in. (K.), 6 5·9-in., 4 4-in., 6 M.	..	..	..	300
,,	Shadie	S.	1815	226 0	35 0	14 0	2	2500	Turkey	..	Bldg.	..	..	6 5·9-in. (K.)	7	17·0	..	..
to. g.b.	Shahani-deria	S.	450	200 0	23 0	9 0	2	3000	Turkey	..	1892	..	..	2 4·7-in. Q.F. (K.), 6 M.	4	22·0	..	..
g.v.	Zuhaf	W.	800	173 6	26 7	11 6	1	160	Turkey	..	1894	..	..	4 4·7-in. (K.), 6 M.	2	12·7	120	..
cr.	Unnamed Unnamed	S.	3250	330 0	42 0	16 0	2	12,000 Nic.	Elswick Philadelphia	..	Bldg.	..	3	2 6-in. Q.F., 8 4·7-in., 6 1·8-in., 6 M.	..	22·0	600	

UNITED STATES.—Armoured Ships.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position	Armour. Deck Plating.	Armament. Guns.	Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	inches.	inches.	inches.			knots.	tons.	
t.	Alabama	S.	11,565	368	0	72	3	24	9	2	11,366 t	Philadelphia	1898	544,539	$9\frac{1}{2}$–$16\frac{1}{2}$	10–15	$2\frac{3}{4}$ 4	4 13-in., 14 6-in. Q.F., 16 6-pr., 6 1-pr., 4 M., 2 l.	4	17·1 t	800 / 1200	536
c.d.s., t. (2 t.)	Amphitrite	I.	90	259	6	55	6	14	8	2	1600	Wilmington	1883 reblt.	..	5–9	$7\frac{1}{2}$–$11\frac{1}{2}$	$1\frac{3}{4}$	4 10-in., 2 4-in. Q.F., 2 6-pr., 2 3-pr., 7 1-pr., 3 M., 1 l.	..	10·5	250	182
c.d.s., t. (1 t.)	Arkansas	S.	3235	252	0	50	0	12	6	2	2100 T.	Newport News	1900	197,267	11	10–11	$1\frac{1}{2}$	2 12-in., 4 4-in. Q.F., 3 6-pr., 6 1-pr., 2 M.	..	11·5	400	131
a. c.	Brooklyn	S.	9215	400	6	64	8	26	2	2	18,769	Philadelphia	1895	613,583	3 H.S.	$5\frac{1}{2}$–8 H.S.	6–3	8 8-in., 12 5-in. Q.F., 12 6-pr., 4 1-pr., 4 M., 2 l.	4	21·9	900 / 1461	517
a. c.	California	S.	13,680	502	0	69	6	24	6	2	23,000 W.T.	S. Francisco	Bldg.	756,000	5–6	6	4	4 8-in., 14 6-in. Q.F., 18 3-in., 12 3-pr., 8 1-pr., 6 M., 2 l.	2 sub.	22·0	900 / 2000	822
a. c.	Charleston	S.	9700	424	0	66	0	25	6	2	21,000 Nic.	Newport News	Bldg.	..	4	4	3	14 6-in. Q.F., 18 14-pr., 12 3-pr., 8 1-pr., 4 M.	..	22·0	650 / 1500	..
a. c.	Colorado	S.	13,680	502	0	69	6	..		2	23,000 Nic.	Philadelphia	Bldg.	756,000	5–6	6	4	4 8-in., 14 6-in. Q.F., 18 3-in., 12 3-pr., 8 1-pr., 6 M., 2 l.	2 sub.	22·0	900 / 2000	822
c.d.s., t. (1 t.)	Florida	S.	3235	252	0	50	0	12	6	2	2100 Nor.	Elizabeth-port	1901	190,075	11	10–11	$1\frac{1}{2}$	2 12-in., 4 4-in. Q.F., 3 6-pr., 6 1-pr., 2 M.	..	11·5	400	131
Super-posed turrets.	Georgia	S.	14,948	435	0	76	3	*		2	19,000 Nic.	Bath, Me.	Bldg.	..	8–11 K.S.	6–11 K.S.	3	4 12-in., 8 8-in., 12 6-in. Q.F., 12 3-in., 12 3-pr., 8 1-pr., 8 M., 2 l.	2 sub.	19·0	900 / 1900	695
t.	Illinois	S.	11,565	368	0	72	3	24	9	2	12,000	Newport News	1898	533,237	$9\frac{1}{2}$–$16\frac{1}{2}$	10–15	$2\frac{3}{4}$–4	4 13-in., 14 6-in. Q.F., 16 6-pr., 6 1-pr., 4 M., 2 l.	4	17·45 t	800 / 1200	536
b.	Indiana	S.	10,288	348	0	69	3	27	2	2	9,738	Philadelphia	1893	620,569	18 H.S.	6–17 H.S.	$2\frac{3}{4}$	4 13-in., 8 8-in., 4 6-in. Q.F., 20 6-pr. Q.F., 6 1-pr., 2 l.	2	15·5	400 / 1597	497
b	Iowa	S.	11,340	360	0	72	3	26	10	2	12,105	Philadelphia	1896	618,514	5–14 H.S.	7–15	$2\frac{3}{4}$	4 12-in., 8 8-in., 6 4-in. Q.F., 20 6-pr., 4 1-pr., 4 M., 2 l.	4	17·1	625 / 1795	510

ram	Katahdin	S.	2155	250	9 43	5 16	0	2	5,068	Bath, Me.	1893	191,102	3–6	18	2–6	4 6-pr. Q.F.	..	16·1	175 192	97
super-posed turrets	Kearsarge / Kentucky	S.	11,540	368	0 72	2 25	10	2	11,954 / 12,318	Newport News.	1898	462,345 each	9½–16½ H. S.	9–17 H. S.	2¾–5	4 13-in., 4 8-in., 14 5-in. Q.F., 20 6-pr., 8 1-pr., 4 M., 2 l.	4	16·8	410 1591	586 / 589
t.	Maine	S.	12,300	388	0 72	2 25	6	2	16,000 Nic.	Philadelphia	1901	592,828	7½–11 K. S.	6–12 K. S	2¾–4	4 12-in., 16 6-in. Q.F., 6 3-in., 8 6-pr., 6 1-pr., 2 M., 2 l.	2 sub.	18·0	1000 2000	551
a.c.	Maryland	S.	13,680	502	0 69	6	..	2	23,000 W.T.	Newport News.	Bldg.	756,400	5 6	6	4	4 8-in., 14 6-in. Q.F., 18 3-in., 12 3-pr., 8 1-pr., 6 M., 2 l.	2 sub.	22·0	900 2000	822
b.	Massachusetts	S.	10,288	348	0 69	3 27	2	2	10,415	Philadelphia	1893	620,569	18 H. S.	6–17 H. S.	2¾	4 13-in., 8 8-in., 4 6-in. Q.F., 20 6-pr., 8 1-pr., 2 M.	2	16·2	400 1597	495
c.d.s., t. (2 t.)	Miantonomoh	I.	4005	259	6 55	6 15	0	2	1,426	Chester	1876 reblt.	..	7	11½	1¾	4 10-in., 2 6-pr. Q.F., 2 3-pr., 6 1-pr., 1 M., 1 l.	..	10·5	250	149
a.c.	Milwaukee	S.	9700	424	0 66	0 25	6	2	21,000 W.T.	S. Francisco.	Bldg.	..	4	4	3	14 6-in. Q.F., 18 14-pr., 12 3-pr., 8 1-pr., 4 M.	..	22·0	650 1500	
t.	Missouri	S.	12,230	388	0 72	3 25	6	2	16,000 T.	Newport News	1901	592,828	8½–12 K. S.	6–12 K. S.	2¾–4	4 12-in., 16 6-in. Q.F., 6 3-in., 8 6-pr., 6 1-pr., 2 M., 2 l.	2 sub.	18·0	1000 2000	551
c.d.s., t. (2 t.)	Monadnock	I.	3990	259	6 55	6 14	7	2	3,000	Vallejo, Cal.	1883 reblt.	..	5–9	7½–11½	1¾	4 10-in., 2 4-in. Q.F., 2 6-pr., 2 3-pr., 2 1·4-in., 2 1-pr., 2 M., 1 l.	..	12·0	250 386	213
c.d.s., t. (1 t.)	Montauk	I.	1875	200	0 46	0 11	9	1	340	Brooklyn	1864	86,903	5	11	..	2 15-in. smooth-bores, 2 12-pr. H.	..	5·5	160	105
c.d.s., t.	Monterey	S.	4084	256	0 59	0 15	4	2	5244	S. Francisco.	1891	315,731	6–13	7½–13	3	2 12-in., 2 10-in., 6 6-pr., 4 1-pr., 2 M., 1 l.	..	13·6	200 233	218
c.d.s., t. (1 t.)	Nahant	I.	1875	200	0 46	0 11	6	1	340	Boston.	1863	84,910	5	11	..	2 15-in. smooth-bores, 2 12-pr. H.	..	6·0	160	105
Super-posed turrets.	Nebraska	S.	14,948	435	0 76	3	*	2	19,000 W. T.	Seattle.	Bldg.	..	8–11 K S.	6–11 K S.	3	4 12-in., 8 8-in., 12 6-in. Q.F., 12 3-in., 12 3-pr., 8 1-pr., 8 M., 2 l.	2 sub.	19·0	900 1900	695
c.d.s., t. (1 t.)	Nevada	S.	3235	252	0 50	0 12	6	2	2,400 Nic.	Bath, Me.	1900	197,267	11	10–11	1½	2 12-in., 4 4-in. Q.F., 3 6-pr., 6 1-pr., 2 M.	..	11·5	400	131
Super-posed turrets.	New Jersey	S.	14,948	435	0 76	3	*	2	19,000 W T.	Quincy, Mass.	Bldg.	..	8–11 K. S.	6–11 K. S.	3	4 12-in., 8 8-in., 12 6-in. Q.F., 12 3-in., 12 3-pr., 8 1-pr., 8 M., 2 l.	2 sub.	19·0	900 1900	695
a.c.	New York	S.	8200	380	6 64	10 26	8	2	17,401	Philadelphia	1891	613,377	4	5½–10	6–3	6 8-in., 12 4-in. Q.F., 8 6-pr., 2 1-pr., 2 M.	2	21·0	750 1290	
t.	Ohio	S.	12,440	388	0 72	3 25	6	2	16,000 T.	S. Francisco.	1901	595,705	7–11 K. S.	8–12 K. S.	3–4	4 12-in., 16 6-in. Q.F., 6 3-in., 8 6-pr., 6 1-pr., 2 M., 2 l.	2 sub.	18·0	1000 2000	521

* Mean draught 23 ft. 9 in.

UNITED STATES.—Armoured Ships—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Belt.	Armour. Gun Position	Armour. Deck Plating.	Armament. Guns.	Torpedo Tubes.	Speed	Normal Coal Supply.	Complement.
			tons.	ft. in	ft. in.	ft. in.	no				£	in.	in.	in.			knots.	tons.	
b.	Oregon	S.	10,288	348 0	69 3	27 2	2	11,111	S. Francisco.	1893	653,447	18 H. S.	6–17 H. S.	$2\frac{3}{4}$	4 13-in., 8 8-in., 4 6-in. Q.F., 20 6-pr., 6 1-pr., 2 M., 2 l.	2	16·8	400 1594	494
a.c.	Pennsylvania	S.	13,680	502 0	69 6	24 6	2	23,000	Philadelphia Nic.	Bldg.	..	5–6 K. S.	6 K. S.	4	4 8-in., 14 6-in. Q.F., 18 3-in., 12 3-pr., 8 1-pr., 6 M., 2 l.	2 sub.	22·0	900 2000	822
c.d.s., t. (2 t.)	Puritan	I.	6060	290 3	60 $1\frac{1}{2}$	18 6	2	3,700	Chester	1882 reblt.	..	6–11	8–14	2	4 12-in., 6 4-in. Q.F., 6 6-pr., 2 1·4-in., 2 1-pr., 1 l.	..	12·4	307	230
Super-posed turrets.	Rhode Island	S.	11,918	435 0	76 3	23 9 ‡	2	19,000	Quincy. Mass. W.T.	Bldg.	..	8–11 K. S.	6–11 K. S.	3	4 12-in., 8 8-in., 12 6-in. Q.F., 12 3-in., 12 3-pr., 8 1-pr., 8 M., 2 l.	2 sub.	19·0	900 1900	695
a.c.	St. Louis	S.	9700	424 0	66 0	25 6	2	21,000 W.T.	Philadelphia (Neafie)	Bldg.	..	4 K. S.	4 K. S.	3	14 6-in. Q.F., 18 14-pr., 12 3-pr., 8 1-pr., 4 M.	..	22·0	650 1500	
a.c.	South Dakota	S.	13,680	502 0	69 6	24 6	2	23,000 W.T.	S. Francisco.	Bldg	..	5–6 K. S.	6 K. S.	4	4 8-in., 14 6-in. Q.F., 18 3-in., 12 3-pr., 8 1-pr., 6 M., 2 l.	2 sub.	22·0	900 2000	822
c.d.s., t. (2 t.)	Terror	I.	3990	259 6	55 6	15 4	2	1,600	Philadelphia	1883 reblt.	..	4–7	$11\frac{1}{2}$	$1\frac{3}{4}$	4 10-in., 2 6-pr., 2 3-pr., 2 1·4-in., 1 l.	..	10·5	250 285	443
t.	Texas	S.	6315	301 4	64 1	25 3	2	8,610	Norfolk	1892	513,716	12	12	2	2 12-in., 6 6-in., 12 6-pr. Q.F., 10 1-pr., 2 M., 1 l.	2	17·8	500 850	177
Super-posed turrets.	Virginia	S.	14,948	435 0	76 3	23 9 ‡	2	19,000 W.T.	Newport News	Bldg.	..	8–11 K. S.	6–11 K. S.	3	4 12-in., 8 8-in., 12 6-in. Q.F., 12 3-in., 12 3-pr., 8 1-pr., 8 M., 2 l.	2 sub.	19·0	900 1900	695
a.c.	West Virginia	S.	13,680	502 0	69 6	24 6	2	23,000 W.T.	Newport News	Bldg.	..	5–6 K. S.	6 K. S	4	4 8-in., 14 6-in. Q.F., 18 3-in., 12 3-pr., 8 1-pr., 6 M., 2 l.	2 sub.	22·0	900 2000	822
t.	Wisconsin	S.	11,565	368 0	72 3	25 5	2	10,000	S. Francisco.	1898	519,666	$9\frac{1}{2}$–$16\frac{1}{2}$	10–15	3·4	4 13-in., 14 6-in. Q.F., 16 6-pr., 4 1-pr., 4 M., 2 l.	4	17·1 *t*	800 1200	531
c.d.s., t. (1 t.)	Wyoming	S.	3235	252 0	50 0	12 6	2	2,400 B.&W.	S. Francisco.	1900	200,350	11	10–11	$1\frac{1}{2}$	2 12-in., 4 4-in. Q.F., 3 6-pr., 6 1-pr., 2 M.	..	11·5	400	131
t.	2 Unnamed †	S.	17,581	450 0	76 2	26 9	2	20,000 W.T.	..	Pro.	..	11 8	10 7	3–$4\frac{1}{2}$	4 12-in., 20 7-in. Q.F., 22 3-in., 8 1-pr., 6 M.	..	19·0	2300	..
a. c.	2 Unnamed †		14,500	502 0	72 8	..	..	25,000 B.&W.	..	Pro.	..	..	..	..	4 10-in., 16 6-in. Q.F., 22 3-in.	..	22·0	900 2000	..

† ... Three other battleships and 2 armoured cruisers, with other vessels, are in the programme of 1902-3. ‡ Mean draught.

UNITED STATES.—Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour.		Armament.		Speed.	Normal Coal Supply.	Complement.
															Gun Position.	Deck.	Guns.	Torpedo Tubes.			
			tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	in.	in.			knots.	tons.	
cr.	Albany (ex Abreu)	S. sh.	3769	345	0	43	9	20	0	2	7400	Elswick	1899	247,611	..	3	6 6-in. Q.F., 4 4·7-in., 10 6-pr., 4 1-pr., 4 M., 2 l.	3	20·0	512 / 754	260
g.b.	Annapolis	S.	1000	168	0	36	0	12	7	1	1227 B.&W.	Elizabeth Pt.	1896	46,789	..	..	6 4-in. Q.F., 4 6-pr., 2 1-pr., 1 M.	..	13·1 t	100 / 225	135
cr.	Atlanta	S.	3000	271	3	42	2	21	1	1	4030 B.&W.	Chester	1884	126,785	..	1½	2 8-in., 6 6-in. Q.F., 6 6-pr., 4 1-pr., 2 M., 1 l.	..	15·6	490	278
cr.	Baltimore	S.	4413	327	6	48	7	23	11	2	10,061	Philadelphia	1888	272,270	4½	4–2½	4 8-in., 6 6-in., 4 6-pr., 2 3-pr., 2 1-pr., 6 M., 1 l.	5	20·1	400 / 1143	386
g.v.	Bancroft	S.	839	187	6	32	0	12	11	2	1213	Elizabeth Pt.	1892	51,371	..	½	4 4-in. Q.F., 8 3-pr., 1 1-pr., 1 M.	1	14·37	100 / 136	195
g.v.	Bennington	S.	1710	230	0	36	0	16	7	2	3436	Chester	1890	100,894	..	½	6 6-in., 2 6-pr., 2 3-pr., 2 1-pr., 2 M.	..	17·5	200 / 403	195
cr.	Boston	S.	3000	271	3	42	2	21	1	1	4300	Chester	1884	127,196	..	1½	2 8-in., 6 6-in., 2 6-pr., 2 3-pr., 2 1-pr., 2 1·8-in., 2 1·4-in., 2 M., 1 l.	..	15·6	495	278
g.v.	Castine	S.	1177	204	0	32	1	14	4	2	2199	Bath, Me.	1892	65,450	..	½	8 4-in. Q.F., 4 6-pr., 2 1-pr., 1 M., 1 l.	..	16·0	125 / 292	151
cr.	Chattanooga }	S. shd.	3200	292	0	44	0	16	8	2	4700 B.&W.	Elizabeth Port	Bldg. 1901	212,325	..	2	10 5-in. Q.F., 8 6-pr., 2 1-pr., 4 M., 1 l.	..	16·5	470 / 700	293
cr.	Cleveland }																				
cr.	Chicago	S.	4500	325	0	48	2	22	6	2	9000 C. & B.&W.	Chester	1885	182,677	4	1½	4 8-in. Q.F., 14 5-in. Q.F., 7 6-pr., 2 1-pr., 2 M., 1 l.	..	18·0	831	409
cr.	Cincinnati	S.	3213	300	0	42	0	20	2	2	10,000	Brooklyn	1892	226,055	..	2½	11 5-in. Q.F., 8 6-pr., 2 1-pr., 2 M., 1 l.	2	19·0	350 / 468	314
cr.	Columbia	S.	7375	412	0	58	2	25	7	3	18,509	Philadelphia	1892	559,950	4	4–2½	1 8-in., 2 6-in., 8 4-in. Q.F., 12 6-pr., 2 1-pr., 2 M., 1 l.	4	22·8 t	750 / 1670	477
g.v.	Concord	S.	1710	230	0	36	0	16	7	2	3405	Chester	1890	100,894	..	½	6 6-in., 2 6-pr. Q.F., 2 3-pr., 2 1·4-in., 2 M., 1 l.	..	16·8	200 / 401	194
cr.	Detroit	S.	2089	257	0	37	0	16	8	2	5227	Baltimore	1891	125,860	..	½	10 5-in. Q.F., 6 6-pr., 2 1-pr., 2 M., 1 l.	2	18·71	200 / 340	256

UNITED STATES.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armour. Gun Position.	Armour. Deck.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft.	in.	ft.	in.	ft.	in.	no.				£	in.	in.			knots.	tons.	
cr. cr.	Denver Des Moines	S. shd.	3200	292	0	44	0	16	8	2	4700 W.T.	Philadelphia Quincy, Mass.	Bldg.	212,325	..	2	10 5-in. Q.F., 8 6-pr., 2 1-pr., 4 M., 1 l.	..	16·5	470 / 700	293
g.v.	Dolphin	S.	1486	240	0	32	0	17	1	1	2253	Chester	1884	64,728	..	..	2 4-in. Q.F., 2 14-pr., 2 6-pr., 2 3-pr., 2 M.	..	15·5	173	117
cr.	Don Juan de Austria*	I.	1130	210	0	32	0	13	0	1	1600	Cartagena	1889	..	..	..	4 5-in. Q.F., 4 6-pr., 4 M.†	3	14·0	210	130
cr.	Galveston	S. shd.	3200	292	0	44	0	16	8	2	4700 W.T.	Richmond, Va.	Bldg.	212,325	..	2	10 5-in. Q.F., 8 6-pr., 2 1-pr., 4 M., 1 l.	..	16·5	470 / 700	293
g.v.	General Alava	S.	1390	212	0	28	3	16	0	1	770	..	..	..	..	..	4 M.	..	10·5	..	..
g.v.	Helena	S.	1397	250	9	40	1	10	0	2	1988	Newport News	1896	57,536	1	½	8 4-in. Q.F., 4 6-pr., 4 1-pr., 2 M., 1 l.	..	15·5 t	106 / 300	256
g.v. g.v.	Isla de Cuba * Isla de Luzon *	S.	1125	192	0	30	0	12	4	2	1000	Elswick	1887	..	..	2½	4 4-in. Q.F., 4 6-pr., 4 M.†	3	14·0	160	160
g.v.	Machias	S.	1177	204	0	32	1	14	4	2	2046 Nor.	Bath, Me.	1891	65,450	..	½	8 4-in. Q.F., 4 6-pr., 2 1-pr., 1 M., 1 l.	..	15·46	125 / 292	151
cr.	Marblehead	S.	2089	257	0	37	0	16	8	2	5451	Boston	1892	138,498	..	½	10 5-in. Q.F., 6 6-pr., 2 1-pr., 2 M., 1 l.	2	18·4	200 / 340	248
d.v.	Marques del Duero*	I.	500	157	5	25	7	8	5	2	550	La Seyne	1875	..	..	..	.. ..	..	10·0	90	98
g.b.	Marietta	S.	1000	174	0	31	0	13	5	2	1054 B.&W.	S. Francisco	1896	45,823	..	..	6 4-in. Q.F., 4 6-pr., 2 1-pr., 1 M., 1 l.	..	13·2 t	100 / 239	140
cr.	Minneapolis	S.	7375	412	0	58	2	25	7	3	20,862	Philadelphia	1893	552,754	4	4–2½	1 8-in., 2 6-in., 8 4-in. Q.F., 12 6-pr., 2 1-pr., 2 M., 1 l.	4	23·0 t	750 / 1200	477
cr.	Montgomery	S.	2089	257	0	37	0	16	11	2	5580	Baltimore	1891	125,860	..	½	10 5-in. Q.F., 6 6-pr., 2 1-pr., 2 M., 1 l.	2	19·0	200 / 340	257
g.v.	Nashville	S.	1371	220	0	38	1	12	0	2	2536 Y.	Newport News	1895	57,536	..	½	8 4-in. Q.F., 4 6-pr., 2 1-pr., 2 M., 1 l.	1	16·7 t	150 / 400	176
cr.	Newark	S.	4098	311	7	49	2	22	7	2	8869	Philadelphia	1890	256,437	3	3–2	12 6-in. Q.F., 8 6-pr., 4 1-pr., 2 M., 1 l.	..	19·0	400 / 809	384
g.b.	Newport	S.	1100	168	0	36	0	13	0	1	1008	Bath, Me.	1896	..	..	..	6 4-in. Q.F., 4 6-pr., 2 1-pr., 1 M.	..	12·2	100 / 230	147

cr.	New Orleans . .	S. shd.	3769	346	0	43	9	19	9	2	7500	Elswick .	1896	293,684	..	3–1¼	6 6-in. Q.F., 4 4·7-in., 10 6-pr., 4 3-pr., 4 M., 2 l.	..	20·0	700 800	407
g.b.	Newport . . .	S.	1000	168	0	36	0	12	7	1	1008	Bath, Me. .	1896	47,406	..	..	6 4-in. Q.F., 4 6-pr. 2 1-pr., 1 M. . .	..	12·3 t	100 239	135
cr.	Olympia . . .	S.	5870	310	0	53	1	24	10	2	17,313	S. Francisco.	1892	369,054	4½–3½	4–2½	4 8-in., 10 5-in. Q.F., 14 6-pr., 7 1-pr., 2 M., 1 l.	6	21·69	400 1169	450
g.r.	Petrel . . .	S.	892	176	3	31	0	13	5	1	1095	Baltimore .	1888	50,755	..	½	4 6-in., 2 3-pr., 2 1-pr, 2 1·4-in., 2 M. .	..	11·8	100 200	122
cr.	Philadelphia . .	S.	4324	327	6	48	7	23	5	2	8815	Philadelphia	1889	277,405	..	4–2½	12 6-in., 4 6-pr., 4 1-pr., 2 M., 1 l. . .	..	19·68 t	400 1085	384
g.b.	Princeton . . .	S	1000	168	0	36	0	12	7	1	800	Camden .	1897	47,262	..	..	6 4-in. Q.F., 4 6-pr., 2 1-pr, 1 M. . .	..	12·0	100 238	135
cr.	Raleigh . . .	S.	3213	300	0	42	0	20	2	2	10,000 B & W.	Norfolk .	1892	226,055	..	2½	11 5-in. Q.F., 8 6-pr., 4 1-pr., 2 M., 1 l.	2	19·0	350 460	313
cr.	Reina Mercedes‡ .	S.	3090	279	10	43	3	19	6	1	3700	Ferrol .	1887	..	..	..	6 6·2-in., 2 2·7-in., 3 2·2-in. Q.F. . .	5	17·5	600	370
cr.	San Francisco . .	S.	4098	310	0	49	2	22	3	2	9913	S. Francisco.	1889	293,435	..	3–2	12 6-in. Q.F., 4 6-pr., 4 3-pr., 2 1-pr., 6 M., 1 l.	4	19·5	350 628	383
cr.	Tacoma . . .	S. shd	3200	292	0	44	0	16	8	2	4700 W. T.	S. Francisco	Bldg.	212,325	..	2	10 5-in. Q.F., 8 6-pr., 2 1-pr., 4 M., 1 l. .	..	16·5	470 700	293
g.v.	Topeka . . .	I	1814	250	0	35	0	..		1	1095	Kiel . .	1881	..	..	..	6 4-in. Q.F., 6 3-pr., 2 1-pr., 1 M. . .	..	16·0	273 410	167
cr.	Vesuvius . . . (Dynamite Gunboat)	S.	929	252	4	26	6	11	2	2	3795	Philadelphia	1888	71,963	..	¼	3 15-in. dynamite guns, 3 3-pr., 2 M. .	..	21·4	152	69
g.r.	Vicksburg . . .	S.	1000	168	0	36	0	12	7	1	1118	Bath, Me. .	1896	47,406	..	..	6 4-in. Q.F., 4 6-pr., 2 1-pr., 1 M. . .	..	12·7 t	100 239	135
g.r.	Wheeling . . .	S.	1000	174	0	34	0	12	7	2	1081	S. Francisco.	1897	65,540	..	..	6 4-in. Q.F., 4 6-pr., 2 1-pr., 1 M., 1 l. .	..	12·9 t	120 226	140
g.r.	Wilmington . .	S.	1397	250	9	40	1	10	0	2	1891	Newport News	1895	57,536	1	¼	8 4-in. Q.F., 4 6-pr., 4 1-pr., 4 M., 1 l. .	..	15·0 t	100 300	175
g.r.	Yorktown . . .	S.	1710	230	0	36	0	16	7	2	3392	Philadelphia	1888	93,496	..	¼	6 6-in. Q.F., 2 6-pr. Q.F., 2 3-pr., 4 1-pr., 2 M., 1 l.	2	16·1	200 380	195

* Captured at Manila after the battle of May 1, 1898. The following gunboats were captured during the war with Spain, or subsequently purchased: Albay, Alvarado, Arayat, Baco lo, Basco, Belusan, Calamianes, Callao, El Cano, Guardoqui, Leyte, Mauileño, Mariveles, Mindoro, Pampanga, Panay, Paragua, Piscatagua, Quiros, Samar, Sandoval, Urdañeta, Villalobos.

† New armament of the captured cruisers.

‡ Sunk at the mouth of Santiago Harbour, July 5, 1898, and refloated.

Also the sailing training ship Chesapeake (1175 tons), built at Bath, Me., and launched 1899.

Enrolled Auxiliary Cruisers of the United States Navy.

	Class.	NAME.	Material of Hull.	Gross Tonnage.	Length.	Beam.	Depth.	Propellers.	Indicated Horse-Power.	Where Built.	When Built.	Owners.	Armament, all Q.F.	Speed.
					ft. in.	ft. in.	ft. in.	no.						
Atlantic Coast.	1st	St. Louis	S.	11,629	535 5	63 0	26 8	2	18,000	Philadelphia	1895	International Navigation Co.	8 5·5-in., 4 6-pr., 4 M.	22·2
	1st	St. Paul	S.	11,629	535 5	63 0	26 8	2	18,000	,,	1895	,,	8 5·5-in., 4 6-pr., 4 M.	22·5
	1st	Paris	S.	10,794	517 0	63 3	22 0	2	20,000	Clydebank, Scotland	1889	,,	12 5·5-in., 6 6-pr., 6 M.	20·7
	1st	New York	S.	10,802	517 0	63 3	22 0	2	20,000	,,	1888	,,	12 5·5-in., 6 6-pr., 6 M.	20·6
	3rd	Newport	I.	2735	326 0	38 2	23 9	1	..	Chester, Pa.	1880	Pacific Mail.	8 4-in., 8 M.	16·0
	3rd	City of Para	I.	3532	345 0	38 6	19 9	1	2250	,,	1878	,,	8 4-in., 8 M.	12·0
	3rd	Caracas	I.	2584	283 6	40 2	20 5	1	..	Philadelphia	1889	Red D Line.	8 4-in., 6 M.	13·0
	3rd	Philadelphia	I.	2520	300 0	35 0	20 6	1	..	,,	1885	,,	8 4-in., 6 M.	12·0
	3rd	Venezuela	I.	2843	303 6	40 2	20 5	1	..	,,	1889	,,	8 4-in., 8 M.	..
	3rd	Orizaba	S.	3497	336 2	43 2	22 0	1	..	Chester, Pa.	1889	Cuba Mail.	8 4-in., 6 M.	14·0
	3rd	Yumuri	S.	3497	336 2	43 2	22 3	1	..	,,	1889	,,	8 4-in., 6 M.	14·0
	3rd	City of Washington	I.	2684	300 5	38 4	19 2	1	2500	,,	1877	,,	8 4-in., 8 M.	15·0
	3rd	Saratoga	I.	2820	298 0	38 6	23 5	1	..	,,	1878	,,	8 4-in., 8 M	14·0
	3rd	Seneca	I.	2729	271 5	40 0	16 4	1	..	,,	1884	,,	8 4-in., 6 M.	..
	3rd	Yucatan	I. & S.	3525	336 2	43 2	22 3	1	..	,,	1890	,,	8 4-in., 6 M.	14·0
	3rd	Segurança	S.	4033	321 3	45 3	17 4	1	..	,,	1890	,,	6 5-in., 4 4-in., 4 1-pr., 3 M.	14·0
	3rd	Vigilancia	S.	4115	321 8	45 2	16 5	1	..	,,	1890	,,	6 5-in., 4 4-in., 4 1-pr., 3 M.	14·0
	4th	Advance	I.	2605	295 0	38 0	23 4	1	1350	,,	1883	Panama R.R. Co.	Small Q.F.	15·0
	4th	Alliança	I.	2985	303 0	42 0	15 0	1	2250	,,	1886	,,	,,	11·0

Pacific Coast.	3rd	City of Sydney	I.	3017	339	0	40	2	20	5	1	1950	Chester, Pa.	1875	Pacific Mail.	6 6-in., 10 6-pr., 2 M.	15·0
	3rd	City of Peking	I.	5079	408	0	47	0	19	5	1	4500	„	1874	„	6 5-in., 12 6-pr.	13·0
	3rd	City of Rio de Janeiro	I.	3548	345	0	38	6	19	9	1	2000	„	1878	„	8 4-in., 8 M.	14·0
	3rd	Peru	S.	3528	336	0	45	9	27	6	1	2800	San Francisco	1892	„	9 5-in., 12 6-pr.	14·0
	4th	City of Panama	I.	1490	248	0	36	0	20	2	1	650	Chester, Pa.	1873	„	Small Q.F.	..
	4th	Colon	I.	2686	280	0	10	0	28	6	1	1350	„	1872	„	„	..
	4th	San Jose	I.	2081	283	0	37	0	21	0	1	1100	„	1882	„	„	..
	4th	San Blas	I.	2075	283	0	37	0	21	0	1	1100	„	1882	„	„	..
	4th	San Juan	I.	2076	283	0	37	0	21	0	1	1400	„	1882	„	„	..
	4th	Acapulco	I.	2572	290	0	40	0	20	0	1	1350	Wilmington	1873	„	„	..

Converted Merchant Vessels Retained.

Class.	NAME.	Material of Hull.	Displacement.	Length.		Beam.		Draught.		Propellers.	Indicated Horse-power.	Where Built.	Date of Launch.	Cost.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
			tons.	ft.	in.	ft.	in.	ft.	in.	No.				£			knots.	tons.	
cr.	Buffalo	S.	6888	380	6	48	0	22	0	1	3600	Newport News	1893	117,949	2 5-in. Q.F., 4 4-in., 6 6-pr., 2 M.	..	14·5	100	297
cr.	Dixie	S.	6114	389	2	48	0	19	11	1	1371	Newport News	1893	117,949	10 6-in. Q.F., 6 6-pr., 2 M.	..	16·0	1371	181
cr.	Panther	I.	4260	310	0	40	0	18	3	1	..	Philadelphia	1889	77,055	6 5-in. Q.F., 2 4-in., 6 3-pr., 1 M., 1 l.	..	13·0	475	198
cr.	Prairie	I.	6872	390	6	46	10	22	0	1	3800	Philadelphia	1890	117,919	10 6-in. Q.F., 6 6-pr., 2 M.	..	14·5	1000	295
cr.	Yankee	I.	6888	380	6	48	0	22	0	1	3800	Newport News	1892	117,949	10 5-in. Q.F., 6 6-pr., 2 M.	..	14·5	1000	282
cr.	Yosemite	I.	6179	389	2	48	0	20	1	1	3800	Newport News	1892	117,919	10 6-in. Q.F., 6 6-pr., 2 M.	..	16·0	1371	285
cr.	Mayflower (yacht)	S.	2690	275	0	36	0	17	3	2	4700	Clydebank	1896	88,359	2 5-in. Q.F., 12 6-pr., 2 M.	..	16·8	584	160

There are also 22 other converted yachts, varying in displacement from 82 tons to 975 tons.

SHIPS BELONGING TO POWERS WHOSE NAVIES ARE OF LESSER IMPORTANCE.

Belgium.—Several steam vessels, between 419 and 684 tons, principally employed as packets, under the orders of the Government. The Ville d'Anvers, 414 tons, for fishery protection.

Bulgaria.—Eleven steamers of small size, of which one is used as the Prince's yacht. Two armoured gunboats, for the defence of the Danube, building at Leghorn. Other ships are to be laid down. The Nadiezda, a despatch vessel (715 tons) of the French Casabianca type; length, 219 ft. 6 in.; beam, 27 ft. 6 in.; draught, 12 ft. 6 in.; launched at Bordeaux in 1898, steamed at 18·85 knots at her trials; engines, 2600 I.H.P.; Lagrafel-d'Allest boilers; armament, 2 3·9-in., 3 1·8-in. Q.F., and 2 torpedo tubes.

Ecuador.—The two old (1886) French despatch vessels, Papin and Inconstant (891 tons), built of wood and iron, have been bought. The Republic also possesses a torpedo boat and two steam transport vessels.

Egypt.—The Nile stern-wheel gunboats Sultan, Sheikh and Melik, 140 tons, Fateh and Naseh, 128 tons; also the Abu Klea, Hafir, Metemmeh and Tamai. Some steam vessels on the coast.

Hayti.—Steel gun vessel—Crête à Pierrot, 940 tons, length 210 ft., beam 30 ft.; 1 6·2-in., 1 4·7-in., and 4 3·9-in. Q.F., 6 M. Steel gunboat—Capois la Mort, 260 tons, 1 3·9-in., and 4 1-pr. Q.F. Iron corvette—Dessalines, 1200 tons, armed with 1 3·9-in. Q.F., 2 3·9-in. B.L., 2 1., 2 M. Two iron or steel sloops—St. Michael, 1804, and Toussaint L'Ouverture, of from 500 to 900 tons, of 12 to 14 knots speed, and armed with 1 large and 4 to 8 small guns. Gun vessel, 22nd of December, of 900 tons, 9 knots speed, armed with 4 40-pr. Armstrongs.

Mexico.—The Zaragoza, built of steel, 1200 tons, 1300 H.P., 15 knots speed, and armed with 4 4·7-in. guns and 4 rapid-firing guns. Two gun vessels—Democrata and Mexico, of 450 tons and 11 knots speed, armed with 2 6½-inch muzzle-loaders and 2 small guns. Two small gunboats of 10 knots speed. Five torpedo boats. Two gun-vessels in hand at Elizabethport, New Jersey, 1000 tons, 200 ft. long, 33 ft. beam, 10 ft. draught; 4 4-in. Q.F., 6 6-pr.; bow torpedo tube; W.T. boilers, 2400 I.H.P., for 16 knots; fitted to serve as transport for 200 troops.

Morocco.—The cruiser El Baschir, of 1200 tons displacement, 2500 H.P., 18 knots speed, built in 1892, has lately been sold to Colombia. A gunboat of 450 tons, 1200 I.H.P., 14·5 knots, built at Sampierdarena (Maclaren & Wilson).

Persia.—Despatch vessel—the Persepolis—of 1200 tons and 10 knots speed. She is armed with 5 small breech-loading guns.

Peru.—Lima, built in 1881, of 1700 tons displacement, 1800 horse-power, and 16 knots speed; armed with two 6-in. B.L.R. guns. Screw steamer Santa Rosa, of about 400 tons.

Roumania.—Elizabeta, protected cruiser (deck 3 in. thick), built in 1887 at Elswick; 230 ft. long, 32 ft. 10 in. beam, 1320 tons, 3000 I.H.P.; 4 5·9-in. B.L.R., 4 Q.F., 2 M., 4 torpedo tubes. Composite gunboat Mircea, 360 tons; Grivitza, 110 tons. Two gunboats of 45 tons, and 3 first-class torpedo boats, these forming the sea division. For the Danube, the gunboats Fulgurul, Oltul, Siretul, Bistritza, 90 to 100 tons, the *torpilleur de barrage* Alexandru cel Bun (104 tons), 5 sloops, 2 small torpedo boats, and the screw steamer Romania, 240 tons, repaired 1890. The shipbuilding programme contemplates the building of 8 monitors of 500 tons, 12 torpedo-boats and 8 vedettes for the Danube, and 6 coast-defence vessels of 3500 tons, 4 destroyers of 300 tons, and 12 torpedo-boats for the Black Sea.

Santo Domingo.—The Independencia, built in England 1894, 170 ft. long, 25 ft. broad, displacement 322 tons, and armed with seven Hotchkiss quick-firing guns. Restauracion, steel gun-vessel, 1000 tons, launched at Glasgow in 1896. The 14-knot cruiser Presidente has been reconstructed, and carries seven guns.

Sarawak.—Two gunboats, of 175 and 118 tons respectively, of low speed, each armed with two guns.

Siam.—Two corvettes (800 tons, 8 guns); six gunboats. One deck-protected cruiser, the Maha Chakrkri, 290 ft. long, 39 ft. 4 in. broad, of 2500 tons displacement and 17 to 18 knots speed; armament, four 4·7-in. quick-firing guns, and ten 6-pr. quick-firing guns. Cruiser Makut-Rajakamar, 650 tons. The gunboats Bali and Sugrib, 600 tons, one 4·7-in. Q.F., five 2·2 in., four 1·4 in., 12 knots, launched 1901.

Uruguay.—Gunboats: General Artigas, 274 tons, 12½ knots speed, 2 4·7-in. (Krupp), 2 M.; General Rivera, 300 tons, 12 knots speed, armed with 1 5·9-in. and 1 2·3-in. gun; and the General Saurez.

Venezuela.—Gun-vessel, Libertador, 832 tons. Four river gunboats. Torpedo gunboats, Bolivar, 571 tons, 18·5 knots, launched 1891; Miranda, 200 tons, 12 knots, launched 1895.

BRITISH AND FOREIGN TORPEDO-BOAT FLOTILLAS.

Great Britain and Dependencies.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Mean Speed on Trial, or expected.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
Great Britain.			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
TORPEDO-BOAT DESTROYERS													
†Ardent	Chiswick	1894	201·6	19	7·3	2	247	4,500	27·97	1-12 pr. 5-6 prs.	2	45	60
Banshee	Birkenhead	1894	210	19·5	..	2	290	4,400	27·97	1-12 pr. 5-6 prs.	2	50	
†Boxer	Chiswick	1894	201·6	19	7·3	2	247	4,500	27·17	1-12 pr. 5-6 prs.	2	45	60
†Bruiser	Chiswick	1895	201·6	19	7·3	2	247	4,500	27·97	1-12 pr. 5-6 prs.	2	45	60
*Charger	Poplar	1894	190	18·5	5·25	2	250	3,100	27·98	1-12 pr. 5-6 prs.	2	45	60
Conflict	East Cowes	1894	205·6	20	..	2	270	4,370	27·21	1-12 pr. 5-6 prs.	2	50	60
Contest	Birkenhead	1894	210	19·5	..	2	290	4,400	27·4	1-12 pr. 5-6 prs.	2	50	60
†Daring	Chiswick	1893	185	19	7	2	237	4,300	27·70	1-12 pr. 3-6 prs.	3	45	50
*Dasher	Poplar	1895	190	18·5	5·25	2	250	3,182	26·21	1-12 pr. 5-6 prs.	2	45	60
†Decoy	Chiswick	1894	185	19	7	2	237	4,300	27·76	1-12 pr. 3-6 prs.	3	45	50
Dragon	Birkenhead	1894	210	19·5	..	2	290	4,500	27·14	1-12 pr. 5-6 prs.	2	50	
Ferret	Birkenhead	1893	194	19·25	5	2	280	4,810	27·62	1-12 pr. 3-6 prs.	3	50	70
Fervent	Paisley	1895	200	19	7·8	2	270	3,800	[27]	1-12 pr. 5-6 prs.	2	50	70
†Handy	Fairfield	1895	200	19	7·8	2	260	3,800	27·04	1-12 pr. 5-6 prs.	2	50	70
Hardy	Sunderland	1895	196	19	5	2	245	4,200	26·8	1-12 pr. 5-6 prs.	2	50	70
†Hart	Fairfield	1895	185	19	7	2	260	4 010	27·07	1-12 pr. 5-6 prs.	2	50	70
*Hasty	Poplar	1894	190	18·5	5·25	2	250	3,250	26·08	1-12 pr. 5-6 prs.	2	45	60
Haughty	Sunderland	1895	196	19	5	2	265	4,000	27·1	1-12 pr. 5-6 prs.	2	50	60
Havock	Poplar	1893	180	18·5	5·25	2	240	3,500	26·77	1-12 pr. 3-6 prs.	3	43	57
Hornet	Poplar	1893	180	18·5	5·25	2	240	4,000	27·31	1-12 pr. 3-6 prs.	3	43	57
†Hunter	Fairfield	1895	200	19·7	6·5	2	260	4,000	27·2	1-12 pr. 5-6 prs.	2	45	60
Janus	Jarrow	1895	200	19·7	6·5	2	252	3,789	27·8	1-12 pr. 5-6 prs.	2	50	60
Lightning	Jarrow	1895	200	19·7	6·5	2	252	4,007	27·94	1-12 pr. 5-6 prs.	2	50	60
Lynx	Birkenhead	1894	194	19·25	5	2	280	4,000	27·00	1-12 pr. 3-6 prs.	3	50	70
Opossum	Hebburn	1895	200	19	5·2	2	290	4,052	28·24	1-12 pr. 5-6 prs.	2	50	60
Porcupine	Jarrow	1895	200	19·7	6·5	2	288	3,866	27·91	1-12 pr. 5-6 prs.	2	50	60
Ranger	Hebburn	1895	200	19	5·2	2	264	3,900	27·13	1-12 pr. 5-6 prs.	2	50	60
Rocket	Clydebank	1894	205·6	19·5	5·25	2	280	4,200	27·37	1-12 pr. 5-6 prs.	2	50	60
Salmon	Hull	1895	200	19·5	5·4	2	264	3,580	27·60	1-12 pr. 5-6 prs.	2	50	60
Shark	Clydebank	1894	205·6	19·5	5·25	2	280	4,250	27·59	1-12 pr. 5-6 prs.	2	50	60
Skate	Barrow	1895	195	20·5	..	2	265	4,100	27·10	1-12 pr. 5-6 prs.	2	50	60
Snapper	Hull	1895	200	19·5	5·5	2	270	4,500	27·9	1-12 pr. 5-6 prs.	2	50	60
Spitfire	Elswick	1895	200	19	5·3	2	300	3,780	27·5	1-12 pr. 5-6 prs.	2	45	60
Starfish	Barrow	1894	195	20·5	..	2	265	4,000	27·97	1-12 pr. 5-6 prs.	2	45	60
Sturgeon	Barrow	1894	195	20·5	..	2	265	4,010	27·16	1-12 pr. 5-6 prs.	2	45	60
Sunfish	Hebburn	1895	200	19	5·2	2	290	4,292	27·62	1-12 pr. 5-6 prs.	2	50	60
Surly	Clydebank	1894	205·6	19·5	5·25	2	280	4,400	28·05	1-12 pr. 5-6 prs.	2	50	50
Swordfish	Elswick	1895	200	19	5·3	2	300	4,100	[27]	1-12 pr. 5-6 prs.	2	45	60
Teazer	East Cowes	1895	200	19·5	5·6	2	270	4,500	[27]	1-12 pr. 5-6 prs.	2	50	60
Wizard	East Cowes	1895	200	19·5	5·2	2	270	4,400	[27]	1-12 pr. 5-6 prs.	2	45	60
Zebra	Blackwall	1895	200	20	6	2	300	3,850	27·00	1-12 pr. 5-6 prs.	2	50	60
Zephyr	Paisley	1895	200	19	5·3	2	270	3,850	[27]	1-12 pr. 5-6 prs.	2	50	60
†Albatross	Chiswick	1898	227·6	21·25	8·5	2	360	7,900	32	1-12 pr. 5-6 prs.	2	68	100
†Angler	Chiswick	1896	210	19·6	7·1	2	278	5,800	30·37	1-12 pr. 5-6 prs.	2	60	80
Arab	Clydebank	1901	218	20·0	5·6	2	360	6,000	31	1-12 pr. 5-6 prs.	2	60	80
†Ariel	Chiswick	1897	210	19·6	7·1	2	278	5,800	30·59	1-12 pr. 5-6 prs.	2	60	80
†Avon	Barrow	1896	210·6	21·6	5·6	2	300	6,000	30	1-12 pr. 5-6 prs.	2	60	80
Bat	Jarrow	1896	215	20·75	6·8	2	326	6,185	30·1	1-12 pr. 5-6 prs	2	60	91
†Bittern	Barrow	1897	210·6	21·6	5·6	2	300	6,000	30	1-12 pr. 5-6 prs.	2	60	80
Brazen	Clydebank	1896	218	20·0	5·6	2	300	6,000	30	1-12 pr. 5-6 prs.	2	60	80
†Bullfinch	Hull	1901	210	20·6	5·8	2	300	5,800	30	1-12 pr. 5-6 prs.	2	60	80
Chamois	Jarrow	1896	215	20·75	6·8	2	325	6,333	30·2	1-12 pr. 5 6 prs.	2	60	91
†Cheerful	Hebburn	1897	210	21·0	8	2	308	6,000	30	1-12 pr. 5-6 prs.	2	62	82
†Coquette	Chiswick	1898	210	19·5	7·2	2	285	5,800	30·31	1-12 pr. 5-6 prs.	2	60	80
Crane	Jarrow	1896	215	20·7	6·8	2	324	6,336	30·3	1-12 pr. 5-6 prs.	2	60	80
†Cygnet	Chiswick	1898	210	19·5	7·2	2	285	5,800	30·35	1-12 pr. 5-6 prs.	2	60	80
†Cynthia	Chiswick	1898	210	19·5	7·2	2	285	5,800	30·2	1-12 pr. 5-6 prs.	2	60	80
†Desperate	Chiswick	1895	210	19·6	7·2	2	275	5,800	30	1-12 pr. 5-6 prs.	2	60	80
†Dove	Hull	1901	210·0	20·6	5·8	2	300	5,800	30	1-12 pr. 5-6 prs.	2	60	80
Earnest	Birkenhead	1896	210·6	21·7	5·3	2	300	6,000	30·13	1-12 pr. 5-6 prs.	2	58	80
Electra	Clydebank	1901	218	20·0	5·6	2	300	6,000	30	1-12 pr. 5-6 prs.	2	58	80
Express	Birkenhead	1897	227 6	22·0	9	2	300	9,000	31	1-12 pr. 5-6 prs.	2	60	80
Fairy	Fairfield	1897	227·6	22·0	9	2	300	6,000	30	1-12 pr. 5-6 prs.	2	60	80
†Falcon	Fairfield	1901	220	21·3	9	2	300	6,600	30	1-12 pr. 5-6 prs.	2	60	80
†Fame	Chiswick	1896	210·6	19·6	7·1	2	275	5,800	30·16	1-12 pr. 5-6 prs.	2	60	80

* Built by Yarrow, fitted with Thornycroft W. T. boilers at Earle's. All Jarrow-built destroyers have Reed's boilers. Vessels marked † have Thornycroft W. T. boilers.

The Cobra and Viper have been lost.

Great Britain and Dependencies—*continued.*

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Mean Speed on Trial, or expected.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
TORPEDO BOAT DESTROYERS			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Fawn	Jarrow	1897	215	20·7	6·8	2	325	6,581	30·5	1–12 pr. 5–6 prs.	2	60	91
Flirt..	Jarrow	1897	215	20·7	6·8	2	328	6,682	30	1–12 pr. 5–6 prs.	2	60	91
Flyingfish	Jarrow	1897	215	20·7	6·8	2	323	6,416	30·4	1–12 pr. 5–6 prs.	2	58	91
†Foam	Chiswick ..	1896	210	19·6	7·1	2	275	5,800	30·18	1–12 pr. 5–6 prs.	2	58	80
Gipsy	Fairfield ..	1897	227·6	22·0	9	2	300	6,000	30	1–12 pr. 5–6 prs.	2	60	80
Greyhound	Hawthorn's ..	1900	210	21	8·6	2	316	6,000	30	1–12 pr. 5–6 prs.	2	60	90
Griffon	Birkenhead ..	1896	210·0	20	5·3	2	300	6,000	30·11	1–12 pr. 5–6 prs.	2	58	80
Kestrel	Clydebank ..	1901	218	20·0	5·6	2	300	6,000	30	1–12 pr. 5–6 prs.	2	60	80
Kangaroo..	Jarrow	1901	215	20·75	6·8	2	335	6,500	30	1–12 pr. 5–6 prs.	2	..	91
†Lee	Sunderland ..	1899	210 0	19·9	7·6	2	283	5,400	30	1–12 pr. 5–6 prs.	2	58	80
Leopard	Barrow	1897	210	20·0	5·6	2	300	6,000	30	1–12 pr. 5–6 prs.	2	60	80
Leven	Fairfield ..	1901	218·0	20.0	5·6	2	300	6,000	30	1–12 pr. 5–6 prs.	2	58	80
Lively	Clydebank ..	1901	218	20·0	5·6	2	300	6,000	30	1–12 pr. 5–6 prs.	2	58	80
Locust	Birkenhead ..	1896	210	21·7	5·3	2	300	6,000	30·16	1–12 pr. 5–6 prs.	2	58	80
†Mallard	Chiswick ..	1896	210·6	19·6	7·1	2	275	5,800	30·11	1–12 pr. 5–6 prs.	2	60	80
Mermaid	Hebburn ..	1898	210	21 0	8	2	308	6,000	30	1–12 pr. 5–6 prs.	2	62	82
Myrmidon	Jarrow	1901	215	20·75	6·8	2	335	6,500	30	1–12 pr. 5–6 prs.	2	..	91
Orwell	Birkenhead ..	1901	218·0	20·0	5·6	2	300	6,000	30	1–12 pr. 5–6 prs.	2	58	80
Osprey	Fairfield ..	1901	227·6	22·0	9	2	300	6,000	30	1–12 pr. 5–6 prs.	2	60	80
†Ostrich	Fairfield ..	1901	210	21·0	9	2	300	6,000	30	1–12 pr. 5–6 prs.	2	60	80
Otter..	Barrow	1896	210	20·0	5·6	2	300	6,000	30	1–12 pr. 5–6 prs.	2	60	80
Panther	Birkenhead ..	1897	210·6	21·7	5·3	2	300	6,000	30·14	1–12 pr. 5–6 prs.	2	58	80
Peterel	Jarrow	1899	215	20·75	6·8	2	331	6,500	30	1–12 pr. 5–6 prs.	2	..	91
Quail	Birkenhead ..	1895	213·6	21·6	5·3	2	300	6,000	30·38	1–12 pr. 5–6 prs.	2	58	90
Racehorse	Hawthorn's..	1900	210	21	8·6	2	316	6,000	30	1–12 pr. 5–6 prs.	2	60	90
Recruit	Glasgow ..	1901	218·0	20·0	5·6	2	300	6,000	30	1–12 pr. 5–6 prs.	2	58	80
Roebuck..	Hawthorn's..	1901	210	21	8·6	2	316	6,000	30	1–12 pr. 5–6 prs.	2	60	90
Seal	Birkenhead ..	1897	218·0	26·0	5·6	2	300	6,000	30·15	1–12 pr. 5–6 prs.	2	58	80
Sparrowhawk	Birkenhead ..	1896	210·6	21·7	5·3	2	300	6,000	30·13	1–12 pr. 5–6 prs.	2	58	80
Spiteful	Jarrow	1898	215	20·75	6·8	2	331	6,500	30·1	1–12 pr. 5–6 prs.	2	..	91
Sprightly	Clydebank ..	1901	218	20·0	5·6	2	300	6,000	30	1–12 pr. 5–6 prs.	2	58	80
†Stag	Chiswick ..	1899	210	19·75	7·2	2	285	5,800	30	1–12 pr. 5–6 prs.	2	60	80
Star	Jarrow	1896	215	20·75	6·88	2	328	6,266	30·7	1–12 pr. 5–6 prs.	2	58	91
Success	Sunderland ..	1901	210·0	21·0	9·2¾	2	350	6,000	30	1–12 pr. 5–6 prs.	2	62	43
†Sylvia	Sunderland ..	1901	210	19·9	7·6	2	283	5,400	30	1–12 pr. 5–6 prs.	2	58	80
Syren	Jarrow	1901	215	20·75	6·8	2	335	6,500	30	1–12 pr. 5–6 prs.	2	..	91
Thorn	Glasgow ..	1901	210	21	5·5	2	300	6,000	30	1–12 pr. 5–6 prs.	2	58	80
Thrasher	Birkenhead ..	1896	210·6	21·7	5·3	2	300	6,000	30·13	1–12 pr. 5–6 prs.	2	58	80
Tiger	Glasgow ..	1901	210	21	5·5	2	300	6,000	30	1–12 pr. 5–6 prs.	2	58	80
Vigilant	Glasgow ..	1901	210	21	5·5	2	300	6,000	30	1–12 pr. 5–6 prs.	2	58	80
†Violet	Sunderland ..	1901	210	20·75	6·88	2	283	5,400	30	1–12 pr. 5–6 prs.	2	58	80
Virago	Birkenhead ..	1896	210·6	21·7	5·3	2	300	6,000	30·13	1–12 pr. 5–6 prs.	2	58	80
*a*Vixen	Barrow	1901	210·0	20·0	5·8	2	327	6,000	30	1–12 pr. 5–6 prs.	2	62	88
Vulture	Clydebank ..	1901	218	20	5·6	2	300	6,000	30	1–12 pr. 5–6 prs.	2	58	80
Whiting	Jarrow	1896	215	20·75	6·88	2	330	6,239	30·2	1–12 pr. 5–6 prs.	2	58	91
Wolf	Birkenhead ..	1897	218	20	5·6	2	300	6,000	30	1–12 pr. 5–6 prs.	2	58	80

Derwent .. .. ..
Eden .. .. ..
Exe .. ..
Ribble .. .. ..
Itchen .. .. .. — No further particulars at present; design not yet complete.
Usk .. ..
Teviot .. .. ..
Ettrick .. .. ..
Foyle .. ..
Erne .. ..

Nine new boats .. .. Programme 1902–3. Design not yet complete.

Name or Number.	Where Built.	Launched.	Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Mean Speed on Trial, or expected.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
TORPEDO BOATS—													
FIRST CLASS—													
1 (*ex* Lightning)	Chiswick ..	1877	84·6	10·9	5	1	27	460	19	..	1	..	
2–9 (8 boats)	Chiswick ..	1878–9	87	10·9	4	1	28	450	20	..	1	15	
10	Chiswick ..	1880	90·5	10·9	4	1	28	450	21·7	..	1	15	
11, 12 (2 boats)	Chiswick ..	1880	87	10·9	4	1	28	450	20	..	1	15	7
13	Lambeth ..	1878	87	10·9	4	1	28	460	21	..	2	15	7
14	Poplar	1878	87	11	4·5	1	33	550	22	..	2	15	7
15	..	..	87	10·9	4	1	28	450	21	..	2	15	7

a Has four Express W. T. boilers.

Great Britain and Dependencies—*continued.*

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
TORPEDO BOATS.													
FIRST CLASS—*cont.*													
17, 18 (2 boats)	Poplar	1877	86	11	4·5	1	33	450	21	..	2	15	7
19	East Cowes	1878	87	10·9	4	1	28	460	21	..	2	15	7
20	..	1880	87	10	4	..	28	360	16·9	..	2	15	
21, 22 (2 boats)	Chiswick	1885	113	12·5	5·7	1	63	730	20	..	3	..	10
23, 24 (2 boats)	Poplar	1885–6	113	12·5	5·5	1	67	600	19·5	2–3 prs.	3	..	
25–29 (5 boats)	Chiswick	1886	127·5	12·5	6·2	1	60	600	21	..	4	15	
30–33 (4 boats)	Poplar	1886	125	13	5·5	1	60–66	670	19·5	2–3 prs.	5	15	20
*a*34–38 (5 boats)	East Cowes	1886	125	14·6	4	1	60–66	950	18–19	..	5	15	
39, 40 (2 boats)	Poplar	1885	100	12·5	..	..	40	500	..	..	1	15	
41–60 (20 boats)	Chiswick	1886	127·5	12·5	6·2	1	60	700	21	2–3 prs.	4	15	
61, 63–74, 76–78 (16 boats)	Poplar	1886	125	13	5·5	1	75	700	19–20	2–3 prs.	5	15	20
79	Poplar	1886	125	13	5·5	..	75	1,000	22·4	2–3 prs.	..	15	20
80	Poplar	1887	135	14	6	1	105	1,540	23	4–3 prs.	5	21	30
81 (*ex* Swift)	East Cowes	1885	150	17·5	..	1	125	..	..	6–3 prs.	3	25	35
82–87 (6 boats)	Poplar	1889	130	13·5	5·5	1	85	1,100	23	3–3 prs.	3	19	20
88, 89 (2 boats)	Poplar	1894	142	14·75	4·5	1	112	1,600	..	3–3 prs.	3	18	20
90	Poplar	1895	140	14·25	3·7	1	100	1,430	..	3–3 prs.	3	18	18
91, 92 (2 boats)	Chiswick	1894	140	15·5	7·5	1	130	2,400	23-24	3–3 prs.	3	18	25
93	Chiswick	1893	140	15·5	5·4	2	130	2,200	23·5	3–3 prs.	3	18	25
94–96 (3 boats)	East Cowes	1894	140	15·5	..	1	130	2,000	23·2	3-3 prs.	3	18	25
97	Birkenhead	1893	140	15·5	..	1	130	2,690	23·35	3–3 prs.	3	18	25
b 98 and 99 / 107 and 108	Chiswick	1901	160	17	8·4	1	178	2,850	25	3–3 prs.	3	32	20
Five new boats	Chiswick	Programme 1901–2. Details not published.											
Four new boats	Programme 1902–3. Design not yet complete.												
SECOND CLASS—													
38–48 (10 boats)	Poplar	1889	60	9·2	3·7	1	16·5	230	16·5	1 mach.	1	9	11
49, 50 (2 boats)	Poplar	1887	60	8·5	3	1	15	200	17	1 mach.	1	9	
51–62 (12 boats)	Chiswick	1878–9	60·5	7·5	3·5	1	..	..	16·5	..	2	7	
63	..	1879	60	..	..	1	..	..	15	..	2		
64–73 (10 boats)	Chiswick	1880–1	60·5	7·5	3·5	1	..	..	16–17	..	2	7	
74, 75, 96, 97 (4 boats)	Poplar	1883	62	7·6	3·6	1	12	..	16	1 mach.	2	7	
76–95 (20 boats)	Chiswick	1882–3	63	7·5	3·5	1	..	..	16·5–17	..	2	7	
98	Chiswick	1883	66·3	7·5	2·5	hyd.	..	120	12·6	..	2	7	
99, 100 (2 boats)	Chiswick	1886	64	8	3·6	1	..	..	16–16·8	..	2	7	
101	..	..	64	..	..	..	..	..	..	..	2	7	
1–9 (9 boats)	East Cowes	..	56	..	..	1	12	..	14·5	2 mach.	sp	..	·7
COLONIAL, ETC.—													
Victoria.													
Childers	Chiswick	1883	113	12·5	5·9	1	65	730	20	2–1 prs.	..	12	10
One boat	Poplar	1891	130	13·5	5·7	1	82	1,150	23	3–3 prs.	3	19	20
Nepean, Lonsdale (2 boats)	Chiswick	1884	63	7·5	3·2	1	12	150	17·5	..	1	7	
New South Wales.													
Acheron, Avernus (2 boats)	..	1879	..	..	..	1	16	300	16				
Queensland.													
Mosquito	Chiswick	1884	63	7·5	3·2	1	12	..	17	..	1	7	
Wasp	..	..	..	..	..	..	12	..	..	..	..	7	
Tasmania.													
One boat	Chiswick	1884	63	7·5	3·2	1	12	..	17	..	1	7	
New Zealand.													
Nos. 1–4 (4 boats)	Chiswick	1884	63	7·5	3	1	12	170	17	1 mach.	Sp.		
India.													
Nos. 1–3 (3 boats)	Chiswick	1888	134·5	14·8	7·1	1	96	1,270	23·2	2 Q.F.	5		
Nos. 4–6 (3 boats)	East Cowes	1889	130	14·6	..	..	95	1,030	20				
No. 7	Paisley	1888	130·4	14	..	..	92	1,060	21				
SUBMARINES—													
5 boats building	Barrow	1901–1	63·4	11·9	..	..	120	160 / 70	8 / 7	..	1	..	..
4 new boats (programme 1902–03).	Barrow	..	..	..	..	..	..	..	..	..	..	..	..

a No. 34 is fitted with Laird W. T. boilers. *b* Water-tube boilers of Thornycroft type.

Argentine Republic.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Length.	Beam.	Draught.								
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Corrientes	Poplar.. ..	1896	190	19 6	7·4	2	280	4,000	27·4 *t.*	*1 14-pr.	3	54	80
Missiones..	Poplar.. ..	1896	190	19·6	7·4	2	280	4,000	26·0 *t.*	3 6-pr,	3	54	80
Entre Rios	Poplar.. ..	1896	190	19·6	7·4	2	280	4,000	26·7 *t.*	Q.F., 2 M.	3	54	80
FIRST CLASS—													
2 boats	Chiswick ..	1890–1	150	14·5	5·2	2	110	1,500	24·52	3 3-prs.	3	27	22
6 boats	Poplar.. ..	1890	130	13·5	6	1	85	1,200	23–24	2 3-pr. Q.F.	2	15	15
4 boats	Poplar.. ..	1880–2	100	12·5	6	1	52	600	20	2 mach.	3	14	10
SECOND CLASS—													
Nos. 1–8 (8 boats) ..	Poplar.. ..	1890	60	9.2	3	1	16	230	17	1 Q.F.	1	10	1·25
Nos. 9–10 (2 boats)	Chiswick ..	1881	60	7·5	3·5	1	16	230	17	..	1		
VEDETTE BOATS—													
Nos. 1–4 (4 boats) ..	..	1875	55	7	..	..	..	..	..	..	sp.		

The two 150-ft. boats are named Comodoro Py and Murature.

The six 130-ft. boats are named Bathurst, Buchardo, Jorge, King, Pinedo, and Thorne. They have locomotive boilers.

The four 100-ft. boats are named Alerta, Centella, Ferre, and Py.

* ½-in. plating over entire engine and boiler space (Yarrow W.T. boilers).

Austria-Hungary.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Length.	Beam.	Draught.								
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Adler, Falke	Poplar.. ..	1886	135	13·7	5·6	1	95	900	22·4	2 Nord.	2	16	28
22 boats	Elbing, Trieste, &c.	1886–9	128	15·9	6·9	1	83	900 1,000	17·5 to 21·5	2 mach.	2	15	28
Boa .. .. Cobra .. .. .. Kigyo .. .. .. Python	Poplar.. ..	1898–9	152·6	15·3	7·6	1	133	2,000	24·3	2 3-pr. Q.F.	3	24	30
Viper	Poplar.. ..	1896	147·6	14·9	7·6	1	130	2,000	26·5	2 3-pr. Q.F.	2	26	30
Natter	Elbing ..	1896	150	17·5	8·8	2	152	2,300	26·5	2 3-pr. Q F.	3	..	30
SECOND CLASS—													
Nos. 9, 10 (2 boats)	Chiswick, Poplar, Pola and Elbing	1881	98·5	10·8	2·9	1	37	450	17	1 Q.F.	1		
Nos. 11–32 (22 boats)		1883–7	107	11·6	3·1	1	47	600	17				
Nos. 33–39 (7 boats)		1887–91	118·1	14·4	3·3	1	64	700	18	2 Q.F.	1		
Nos. 2–8 (7 boats) ..	Pola and Poplar ..	1878–81	87·4	9·6	2·8	1	27	300	15	..	1		

Brazil.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Nos. 1–5 (5 boats	Poplar.. ..	1882	100	12·5	5·5	1	52	600	20	2 mach.	2	16	20
Araguary	Chiswick ..	1891	150	14·5	5·2	2	150	1,550	25·1	2 Q.F.	4	27	22
Iguatemi	Chiswick ..	1891	150	14·5	5·2	2	150	1,550	25·4	2 Q.F.	4	27	22
Marcilio Diaz	Chiswick ..	1891	150	14·5	5·2	2	150	1,550	25·8	2 Q.F.	4	27	22
5 boats	Elbing ..	1892–3	152	17·2	7·9	2	130	2,200	28	2–1 prs.	3	24	30
Piratiny	..	..	130	12	..	..	..	..	10	2–1 pr.	1		
Poty	..	..	126	12	3	..	30	..	18	1–1 pr.	1		
SECOND CLASS—													
Inhanhuay (wood)..	New York..	1893	90	10	3	..	17	..	25	1–1 pr.	1	10	
4 boats	..	1883–4	..	..	..	1	17	..	17				
1 boat	Chiswick ..	1885	63	75	3·2	1	..	..	17	..	..	..	2
1 boat	Poplar.. ..	1886	60	8	3	1	14	200	17	..	1		
THIRD CLASS—													
Moxoto	Poplar.. ..	1883	60	9·3	..	..	..	..	16	1–1 pr.	1		
5 boats	Chiswick ..	1883	45	6	1·2	1	3·5	..	12-13	1 mach.	sp.		

Chili.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Capitan Orella ..	Birkenhead.	1896	210	21·6	..	2	300	6000	30·17	1-12 pr. Q F. 5-6 pr.	2	65	90
Capitan Munoz Gamero.. ..	Birkenhead .	1896	210	21·6	..	2	300	6000	30·42	1-12 pr. Q.F. 5–6 pr.	2	65	90
Teniente Serrano ..	Birkenhead .	1896	210	21·6	..	2	300	6000	30·35	1–12 pr. Q.F. 5-6 pr.	2	65	90
Guardia-Marina Riquelme ..	Birkenhead .	1896	210	21·6	..	2	300	6000	30·09	1-12 pr. Q.F. 5-6 pr.	2	65	90
Capitan Merino Tarpa .. .. .. Capitan O'Brien ..	Birkenhead .	1901	..	..	..	2	350	6000	30	..	..	..	..
FIRST CLASS—													
3 boats	Poplar.. ..	1881	86	12·5	..	1	25	400	19–20	..	4	15	
5 boats	Poplar.. ..	1881	100	12·5	..	1	35	400	18–19	4 mach.	4	15	9
Sarjento Aldea ..	Poplar.. ..	1886	125	13·5	5·5	1	70	800	20	2 Q.F.	4	18	15
Injeniero Hyatt, Cirujano Videla, Injeniero Mutilla, Guardia-Marina Contreras, Capitan Thompson, and Teniente Rodriguez (Viper type) ..	Poplar.. ..	1896 1898	152·6	15·3	7·9	1	140	2200	27·5 27·2	3-3 pr. Q.F.	3	28	40
Janequeo, Guale, Rucumilla and Gualcolda	Poplar.. ..	1881	100	12·5	..	1	..	450	..	..	..	..	
Tegualda, Quidora, and Fresia	Poplar.. ..	..	87	10·9	..	1	..	400	..	..	..	..	
SECOND CLASS—													
1 boat	East Cowes	1887	50	..	..	..	..	..	16	..	..	..	
1 boat	East Cowes	1892	60	9·6	5	1	15	270	19	..	1	..	
1 boat	La Seyne ..	1895	42	8·6	..	1	..	..	..	..	1	..	

The Thompson and Rodriguez were sent out in sections, and put together at Talcahuano and Valparaiso.

China.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons
FIRST CLASS—													
1 boat	Elbing ..	1886	144·3	16·4	7·5	1	128	1,400	24·2	4 1-pr. revs.	2	20	15
1 boat	Poplar.. ..	1887	128	13	5	1	69	1,000	23·9	3 Q.F., 4 Gatlings	3	28	15
25 boats	Stettin, &c..	1886–87	110	13	4·9	1	65	1,000	19·5	1-pr. revs.	3	16	10
2 boats	Stettin ..	1883	86	10·4	3·4	1	28	650	18·2	1-pr. revs.	2	16	12
1 boat	Stettin ..	1884	123·5	21·7	..	..	..	..	19	..	5	16	
2 boats	Elbing ..	1895	128	15·8	..	..	120	1,250	24·5	Q.F.	2		
SECOND CLASS—													
11 boats	Elbing ..	1885–86	85	11·9	4·8	1	27	400	19	..	1	..	5
1 boat	Foochow ..	Bldg.	88·6	6·7	3·3	1	30	550	20·5				

About twenty boats only are said to be serviceable. The four destroyers built at Elbing in 1898–9 were captured by the Allies at Taku, 1900, and added to the navies of Great Britain, France, Germany and Russia.

Costa Rica.

Costa Rica has one 62-ft., 15-knot boat.

Denmark.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
FIRST CLASS—													
Hajen	Copenhagen	1896											
Havörnen	Copenhagen	1897	154·3	15·4	7·9	2	142	2,317	22·9	1 4·7-in. 1 1-pr.	3	..	..
Söbjörnen .. .	Copenhagen	1898											
Delfinen	Chiswick ..	1883	111·5	12·6	6	1	59	620	20	1 mach.	2	14	9
Havhesten	Chiswick ..	1888	137·9	14	7	1	94	1,200	22·8	2 1-pr. revs.	4	20	15
Hvalrossen	Chiswick ..	1884	114	12·6	6·5	1	64	660	18·7	1 mach.	2	14	10
Makrelen	Copenhagen	1893	140	14·2	7	2	112	1,200	..	..	..	..	16
Narhvalen	Chiswick ..	1888	137·9	14	7	1	94	1,200	22·3	2 1-pr. revs.	4	20	15
Nord Kaperen.. ..	Copenhagen	1893	140	14·2	7	2	112	1,200	..	2 1-pr. revs.	4	..	16
Sölöven	Chiswick ..	1887	131	14·8	6·8	1	89	1,200	23·3	2 mach.	4	20	14
Sónlven	Havre.. ..	1880	94·8	10·9	3·9	1	37	450	18·1	..	2	12	5
Springeren	Copenhagen	1891	119	13	4·9	1	81	800	18·3	2 1-pr. revs.	2	20	14
Stören	Chiswick ..	1887	131	14·8	6·8	1	89	1,200	23	2 mach.	4	20	14
Sværdfisken	Chiswick ..	1881	110	12	6	1	49	600	20·7	1 mach.	2	14	9
SECOND CLASS—													
Nos. 4, 5 (2 boats)..	Chiswick ..	1882	63	7·5	2·5	1	15	150	16·9	1 mach.	2	6	1
Nos. 6, 7 (2 boats)..	Chiswick ..	1884	66·8	8	4·2	1	16	170	15·4	1 mach.	2	6	1·5
Nos. 8, 9 (2 boats)..	Chiswick ..	1886	69·5	8·1	3·8	1	17	170	15·7	1 mach.	2	6	1
Nos. 10, 11 (2 boats).	Chiswick ..	1888	70·2	8	4	1	18	180	15·8	1 mach.	2	6	1
Nos. 12, 13 (2 boats).	Chiswick ..	1889	78·3	9	4·9	1	24	350	18	1 mach.	2	8	3
1 boat	Chiswick ..	1875	58	7·5	3	1	..	..	16	..	sp.		

Four destroyers and two boats are provided for.

France.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—													
Arbalète	Normand	Bldg.	183·9	20·11	10·3	2	300	6000	26	1-9pr. 6-3prs.	2	..	..
Arc	Chalon	Bldg.	183·9	20·11	10·3	2	300	6000	26	1-9pr. 6-3prs.	2	..	..
Arquebuse	Normand	Bldg.	183·9	20·11	10·3	2	300	6000	..	1-9pr. 6-3prs.	2	..	..
Baliste	Rouen	Bldg.	183·9	20·11	10·3	2	300	6000	26	1-9pr. 6-3prs.	2	..	..
Bélier	Nantes	Bldg.	183·9	20·11	10·3	2	300	6000	26	1-9pr. 6-3prs.	2	..	..
Bombarde	Havre	Bldg.	183·9	20·11	10·3	2	300	6000	26	1-9pr. 6-3prs.	2	..	..
Carabine	Rochefort	Bldg.	183·9	20·11	10·3	2	300	6000	..	1-9pr. 6-3prs.	2	..	..
Catapulte	Havre	Bldg.	183·9	20·11	10·3	2	300	6000	26	1-9pr. 6-3prs.	2	..	..
Dard	Rouen	Bldg.	183·9	20·11	10·3	2	300	6000	26	1-9pr. 6-3prs.	2	..	..
Durandal	Normand	1899	180·5	20·8	10·3	2	300	5000	27·4	1-9pr. 6-3prs.	2	45	84
Epée	Havre (F.&C.)	1900	183·9	20·8	10·3	2	300	5700	26	1-9pr. 6-3prs.	2	45	33
Epieu	Havre (F.&C.)	Bldg.	183·9	20·11	10·3	2	300	6000	..	1-9pr. 6-3prs.	2	..	..
Escopette	Rochefort	1900	183·9	20·8	10·3	2	300	5700	26	1-9pr. 6-3prs.	2	45	48
Espingole	Normand	1900	183·9	20·8	10·3	2	300	5000	27·2	1-9pr. 6-3prs.	2	45	84
Fauconneau	Normand	1900	183·9	20·8	10·3	2	300	5000	27·1	1-9pr. 6-3prs.	2	45	84
Flamberge	Rochefort	1901	183·9	20·8	10·3	2	300	5700	26	1-9pr. 6-3prs.	2	45	48
Francisque	Rochefort	Bldg.	183·9	20·11	10·3	2	300	6000	26	1-9pr. 6-3prs.	2	..	..
Fronde	Bordeaux	Bldg.	183·9	20·11	10·3	2	300	6000	..	1-9pr. 6-3prs.	2	..	..
Hallebarde	Normand	1899	180·5	20·8	10·3	2	300	5000	27·2	-9pr. 6-3prs.	2	45	84
Harpon	Bordeaux	Bldg.	183·9	20·11	10·3	2	300	6000	..	1-9pr. 6-3prs.	2	..	..
Javeline	Nantes	Bldg.	183·9	20·11	10 3	2	300	6000	..	1-9pr. 6-3prs.	2	..	..
Mousquet	Nantes	Bldg.	183·9	20·11	10·3	2	300	6000	..	1-9pr. 6-3prs.	2	..	..
Mousqueton	Chalon	Bldg.	183·9	20·11	10·3	2	300	6000	26	1-9pr. 6-3prs.	2	..	..
Pertuisane	Rochefort	1900	183·9	20·8	10·3	2	300	5700	26	1-9pr. 6-3prs.	2	45	48
Pique	Havre (F.&C.)	1900	183·9	20·8	10·3	2	300	5700	26	1-9pr. 6-3prs.	2	48	33
Pistolet	Nantes	Bldg.	183·9	20·11	10·3	2	300	6 00	26	1-9pr. 6-3prs.	2	..	..
Rapière	Rochefort	1901	183·9	20·8	10·3	2	300	5700	26	1-9pr. 6-3prs.	2	45	48
Sabre	Rochefort	Bldg.	183·9	20·11	10·3	2	300	6000	26	1-9pr. 6-3prs.	2	..	.
Sagaie	Havre (F.&C.)	Bldg.	183·9	20·11	10·3	2	300	6000	..	1-9pr. 6-3prs.	2	..	..
Sarbacane	Rochefort	Bldg.	183·9	20·11	10·3	2	300	6000	..	1-9pr 6-3prs.	2	..	..
Takou*	Elbing	1898	193·7	21·0	..	2	280	6000	35	6-3 pr. Q.F.	2	..	67
Yatagan	Nantes	1900	183 9	20·8	10·3	2	300	5700	26	1-9pr. 6-3prs.	2	48	33
M 32 to 39	..	Pro.	183·9	19·6	10·3	2	303	4800	26	1-9 pr.	2	48	37
SEA-GOING—													
Agile	La Seyne	1889	139	14·7	7·7	2	121	1,100	20·4	3-3 prs.	2	26	14
Alarme	St. Nazaire	1889	151	15·7	8·3	2	169	1,400	20·5	2-3 prs.	4	30	40
Aquilon	Normand	1895	137·8	14·6	7·9	2	127	2,060	26·17	2-3 prs.	2	34	17
Archer	Normand	1893	138	14·7	6·5	2	131	1,250	21	2-3 prs.	2	26	17
Argonaute	St. Denis	1893	141	16·4	9·3	2	132	1,500	25·1	2-3 prs.	2	34	16
Audacieux	Nantes	1900	144·2	15·2	10·0	2	152	4,200	30	2-3 prs.	2	..	18
Aventurier	St. Nazaire	1889	151	15·7	8·3	2	174	1,400	20·5	2-3 prs.	4	34	40
Averne	Havre (F.&C.)	1894	141	16·4	9·3	2	133	1,500	24·4	2-3 prs.	2	27	16
Borée	Bordeaux	1900	147·7	16·7	8·0	2	160	4,400	30	2-3 prs.	2	..	18
Bourrasque	Normand	1901	147·7	16·7	8·0	2	160	4,400	31·41	2-3 prs.	2	..	18
Cerbère	..	1899	137·8	14·6	7·9	2	127	2,000	25	2-3 prs.	2	34	17
Chevalier	Normand	1893	144·3	15·7	6·8	2	134	2,700	27·2	2-1 prs.	2	32	17
Corsaire	St. Denis	1893	160·5	15	5·4	2	171	2,500	25·5	4-1 prs.	2	32	15
Coureur	Chiswick	1888	147·5	14·5	4·6	2	129	1,550	23·28	4 Nords.	2	27	22
Cyclone (ex-Tenare)	Normand	1898	144·2	15·2	10·0	2	152	4,200	30	2-3 prs.	2	..	18
Dauphin	Havre (F.&C.)	1894	141	16·4	9·3	2	137	1,500	25·22	2-3 prs.	2	34	16
Défi	St. Nazaire	1889	151	15·7	8·3	2	173	1,400	21	2-3 prs.	4	30	40
Dragon	Normand	1892	138	14·7	8·2	2	129	1,400	25	2-3 prs.	2	26	15·5
Eclair	La Seyne	1891	144·3	14·7	7·7	2	128	1,100	21·5	3-3 prs.	2	26	17
Flibustier	Normand	1894	143	16·4	9·3	2	132	1,500	23·5	2-3 prs.	2	34	16
Forban	Normand	1895	144·2	15·2	10	2	135	3,200	31·2	2-1 prs.	2	..	..
Grenadier	Normand	1892	138	14·7	8·2	2	129	1,400	25·25	2-3 prs.	2	26	15·5
Grondeur	Havre (F.&C.)	1892	147·5	14·5	5	2	130	1,550	24	2-3 prs.	2	27	20
Kabyle	La Seyne	1891	144·3	14·7	7·7	2	128	1,100	21·6	3-3 prs.	2	27	17
Lancier	Normand	1893	138	14·7	8·2	2	128	1,400	25·79	2-3 prs.	2	26	15·5
Mangini	Nantes	1896	147·6	14·8	7·9	2	129	2,100	27·5	2-3 prs.	2	34	17
Mistral	Normand	1901	147·7	16·8	8·8	2	182	4,200	30	2-3 prs.	3	..	23
Mousquetaire	Havre (F.&C.)	1892	154	15·7	7	2	150	2,100	24·77	2-1 prs.	2	32	18
Orage	La Seyne	1891	144·3	14·7	7·7	2	128	1,100	21·7	3-3 prs.	2	26	17
Ouragan	Nantes	1887	151	15·7	8·3	2	174	1,400	20	2-3 prs.	4	30	40
Rafale	Normand	Bldg.	147·7	16·7	8·0	2	160	4,400	31·47	2-3 prs.	2	..	18
Sarrasin	Bourdeaux	1893	139	14·7	7·7	2	131	1,100	20·5	3-3 prs.	2	26	14
Simoun	Havre (F.&C.)	1901	144·2	15·2	10·0	2	152	4,200	30	2-3 prs.	2	..	18
Siroco	Normand	1901	147·7	16·8	8·8	2	182	4,200	30	2-3 prs.	3	..	23
Teméraire	St. Nazaire	1889	151	15·7	8·3	2	174	1,400	21	2-3 prs.	4	30	40
Tourbillon	Bourdeaux	1892	139	14·7	7·7	2	131	1,100	20·5	3-3 prs.	2	26	14
Tourmente	St. Denis	1893	141	16·4	9·3	..	132	1,500	24·6	2-3 prs.	2	25	15
Tramontane	Bordeaux	1900	147 7	16·7	8·0	2	160	4,400	30	2-3 prs.	2	..	18
Trombe	Nantes	1900	144·2	15·2	10·0	2	152	4,200	30	2-3 prs.	2	..	18
Turco	St. Denis	1892	138	14·7	8·2	2	124	1,400	21·3	2-3 prs.	2	26	15·5
Typhon	Havre (F.&C.)	1901	144·2	15·2	10·0	2	152	4,200	30	2-3 prs.	2	..	18
Véloce	Havre (F.&C.)	1892	147·5	14·5	5	2	130	1,550	23·6	2-3 prs.	2	27	20
Zouave	St. Denis	1892	138	14·7	8·2	2	124	1,400	21·3	2-3 prs.	2	26	15·5

* Captured from the Chinese at Taku, 1900. N.B.—"F. & C." "Forges et Chantiers."
"Normand" means that the boat has been built at that firm's yard at Havre.

France—*continued.*

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
FIRST CLASS—													
Balny	Normand ..	1886	134·5	11	7·2	1	66	700	20	2–1 pr. rev.	2	21	12
Bouët-Willaumez	St. Denis ..	1888	134·5	11	7·2	1	66	700	20	2–1 pr. rev.	2	21	12
Capt. Cuny	..	1886	134·5	11	7·2	1	66	700	20	2–1 pr. rev.	2	21	12
Capt. Mehl	..	1886	134·5	11	7·2	1	66	700	20	2–1 pr. rev.	2	21	12
Challier	..	1886	134·5	11	7·2	1	66	700	20	2–1 pr. rev.	2	21	12
Dehorter	St. Denis ..	1886	134·5	11	7·2	1	66	700	20	2–1 pr. rev.	2	21	12
Deroulède	Normand .	1886	134·5	11	7·2	1	66	700	20	2–1 pr. rev.	2	21	12
Doudart de Lagrée	Normand ..	1886	134·5	11	7·2	1	66	700	20	2–1 pr. rev.	2	21	12
Edmond Fontaine	St. Denis ..	1888	134·5	11	7·2	1	66	700	20	2–1 pr. rev.	2	21	12
126–129 (4 boats)	Normand ..	1889–0	118	13·2	8·6	1	80	1,250	21	2–1 prs.	2	21	10
145–149 (5 boats)	Normand ..	1891–3	118	13·2	8·7	1	79	1,300	23·9	2–1 prs.	2	21	10
152–154 (3 boats)	Normand ..	1892–3	118	13·2	8·7	1	80	1,300	24·6	2–1 prs.	2	21	10
155–157 (3 boats)	Bordeaux ..	1893	118	13·2	8·7	1	80	1,300	23	2–1 prs.	2	21	10
158–160 (3 boats)	Cail	1893	118	13·2	8·7	1	80	1,300	23	2–1 prs.	2	21	10
161–163 (3 boats)	St. Nazaire..	1892	118	13·2	8·7	1	80	1,300	23	2–1 prs.	2	21	10
164–166 (3 boats)	La Seyne ..	1892	118	13·2	8·7	1	79	1,300	23	2–1 prs.	2	21	10
167–169 (3 boats)	Creusot ..	1892	118	13·2	8·7	1	81	1,300	23	2–1 prs.	2	21	10
170, 171 (2 boats)	Normand ..	1893	118	13·2	8·7	1	80	1,300	23–2	2–1 prs.	2	21	10
172, 173 (2 boats)	Havre	1893–4	118	13·2	8·7	1	89	1,390	23–24	2–1 prs.	2	21	10
174–176 (3 boats)	Havre	1893–5	118	13·2	8·7	1	94	1,390	23–24	2 1-prs.	2	21	10
177–179 (3 boats)	Havre	1893	118	13·2	8·7	1	79	1,300	23–24	2–1 prs.	2	21	10
180–187 (8 boats)	Normand, etc.	1894–5	118	13·2	8·6	1	80	1,500	25·7	2–1 prs.	2	21	10
188–191 (4 boats)	Havre, etc.	1893–4	118	13·2	8·6	1	80	1.500	24–2	2–1 prs.	2	21	10
192–194 (3 boats)	Havre, etc.	1894–5	118	13·2	8·	1	82	1,300	23·55	2–1 prs.	2	21	10
195–200 (6 boats)	Havre, etc.	1894–5	319	13·2	8·7	1	80	1,300	23·5	2 1-prs.	2	21	10
201–205 (5 boats)	Normand ..	1897–8	121·4	13·4	8·6	1	84	1,700	25·9	2–1 prs.	2	23	10
206–211 (6 boats)	Bordeaux ..	1897–8	121·4	13·6	8·6	1	86	1,500	23·5	2 1-prs.	2	23	10
212–215 (4 boats)	Normand ..	1899	121·4	13·6	8·6	1	86	1,800	27	2 1-prs.	2	23	10
216–226 (11 boats) ..	Cherbourg, Toulon, etc.	1899	121·6	13·6	8·6	1	86	1,500	23·5	2–1 prs.	2	23	10
227–235 (9 boats)	Bordeaux,etc.	Bldg.	121·4	13·2	8·7	1	86	1,500	23·5	2-1-prs.	2	23	10
236–255 (20 boats) ..	Bordeaux,etc.	Bldg.	121.4	13·2	8·7	1	86	1,500	23·5	2-1-prs.	2	23	10
256–257 (2 boats)	..	1900	121·4	13·2	3·7	1	86	1,500	23·5	2–1 prs.	2	23	10
258–261 (4 boats)	Bordeaux ..	Bldg.	121·4	13·2	3·7	1	86	1,500	23·5	2–1 prs.	2	23	10
262–263 (2 boats)	Creusot ..	Bldg.	121·4	13·2	3·7	1	86	1,500	23·5	2–1 prs.	2	23	10
264–265 (2 boats)	Bordeaux ..	1902	121·4	13·2	3·7	1	86	1,500	23·5	2–1 prs.	2	23	10
266–276 (11 boats) ..		Bldg.	121·4	13·2	3·7	1	86	1,500	23·5	2–1 prs.	2	23	10
277, P 112, 138, 244, 177 (5 boats)	Saigon ..	Bldg.											
SECOND CLASS—													
26	..	1878	108	11	5·6	1	45	400	19	2–1 prs.	2	16	10
27	..	1878	104·4	10·6	6·1	1	44	400	19	2–1 prs.	2	16	10
28	..	1878	111·5	11	5·6	1	44	400	19	2–1 prs.	2	16	10
60–64 (5 boats)	Normand ..	1883	108·2	10·3	6·1	1	45	400	19	2–1 prs.	2	16	10
65, 66, 68 (3 boats) ..	Normand ..	1884	108·2	10·7	6·4	1	49	500	20	2–1 prs.	2	16	10
69–74 (6 boats)	Normand ..	1885	108·2	10·7	6·5	1	50	500	20	2–1 prs.	2	16	10
75–82, 84–109 (34 boats)	Cail. etc. ..	1885–92	111·7	10·6	6	1	54	525	20	2–1 prs.	2	16	10
111–125 (11 boats) ..	La Seyne, etc.	1885–90	114·7	10·6	6	1	54	525	20	2–1 prs.	2	16	10
130–132, 134–144 (14 boats)	Normand ..	1890–91	111·5	11·4	6	1	52·8	520	21	2–1 prs.	2	16	10
THIRD CLASS—													
8, 10–16, 18, 19 (10 boats)	Various Firms in France and England.	1877–82	86	10·2	5	1	27	200–450	16–19	..	..	10	
20			87	10·8	5	1	33			..	..	10	
22, 23 (2 boats)			87·6	10·4	5·2	1	30			..	..	10	
24, 25 (2 boats)			88·5	10·4	6	1	30			..	..	10	
31			85·5	10·4	3·8	1	27			..	..	10	
33–36 (4 boats)			89	10·4	6	1	32			..	..	10	
37–40 (4 boats)			87	10·8	5	1	32			..	..	10	
41, 42 (2 boats)			87	10·8	6	1	33			..	..	10	
43, 44 (2 boats)			89	10·4	5·7	1	32			..	..	10	
47			87	10·8	5	1	33			..	..	10	
48			89	10·4	5·8	1	32			..	..	10	
49, 50, 53 (3 boats) ..			87	10·8	5	1	32			..	..	10	
54, 55 (2 boats)			91	10	6·1	1	32			..	..	10	
VEDETTE BOATS—													
(1 boat) (aluminium)..	Poplar ..	1894	62·3	9·1	..	1	14	210	20·5	..	1	8	
29, 30 (2 boats)	Chiswick ..	1876	67	8·5	3·5	1	16	..	18	..	1	8	
56, 57 (2 boats)	Chiswick ..	1879	59	7·5	3·5	1	12	50	16	..	1	8	
58, 59 (2 boats)	Chiswick ..	1881	63	7·5	3·5	1	11	50	17	..	1	8	
A, B, C	Creusot ..	1894	62·4	8·9	4·9	1	15	210	16·5	..	1	9	
D, E, F, G, H, I* ..	Creusot ..	1900											
SUBMARINE—													
Algérien	Cherbourg ..	1901	148·8	9·2	..	1	146	..	..	..	..	..	..
Alose	Toulon ..	Bldg.	77	7·6	8·0	1	68	..	8	..	..	5	..
Anguille	Toulon ..	Bldg.	77	7·6	8·0	1	68	..	8	..	..	5	..
Bonite..	Toulon ..	Bldg.	77	7·6	8·0	1	68	..	8	..	..	5	..
Castor	Rochefort ..	Bldg.	77	7·6	8·0	1	68	..	8	..	..	5	..

* For the torpedo-transport Foudre.

The Libellule, a turbine-motor torpedo boat, is in hand at Cherbourg.

First-class boats: 140 others are included in the programme, 1902, or to be completed between 1902 and 1906.

France *continued.*

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
SUBMARINE—*contd.*			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Dorade	Toulon	Bldg.	77	7·6	8·0	1	68	..	8	..	..	5	..
Espadon‡	Cherbourg	1901	111·6	12·0	5·4	1	106–206	250	8–12	..	2	11	..
Esturgeon	Toulon	Bldg.	77	7·6	8·0	1	68	..	8	..	..	5	..
Farfadet	Rochefort	1901	135·8	9·5	9·5	1	185	..	9–12½	..	..	9	..
Français	Cherbourg	1901	148·8	9·2	..	1	146	..	..	..	..	..	..
Gnome	Rochefort	1901	135·8	9·5	9·5	1	185	..	9–12½	..	..	9	..
Grondin	Toulon	Bldg.	77	7·6	8·0	1	68	..	8	..	..	5	..
Gustave Zédé	Toulon	1893	159	12·4	..	1	266	720	8–12	..	1	8	..
Gymnote	Mourillon	1888	55·6	5·9	5·9	1	30	60	4–6	..	..	4	..
Korrigan	Rochefort	1901	135·8	9·5	9·5	1	185	..	9–12½	..	..	9	..
Loutre	Rochefort	Bldg.	77	7·6	8·0	1	68	..	8	..	..	5	..
Ludion	Cherbourg	Bldg.	77	7·6	8·0	1	68	..	8	..	..	5	..
Lutin	Rochefort	1901	135·8	9·5	9·5	1	185	..	9–12½	..	..	9	..
Lynx	Cherbourg	Bldg.	77	7·6	8·0	1	68	..	8	..	..	5	..
Méduse	Rochefort	Bldg.	77	7·6	8·0	1	68	..	8	..	..	5	..
Morse	Cherbourg	1899	118	9·2	9·9	1	144	..	8–12·3	..	1	9	..
Naïade	Cherbourg	Bldg.	77	7·6	8·0	1	68	..	8	..	..	5	..
Narval‡	Cherbourg	1899	111·6	12·0	5·4	1	106–206	250	8–12	..	2	11	..
Otarie	Rochefort	Bldg.	77	7·6	8·0	1	68	..	8	..	..	5	..
Oursin	Rochefort	Bldg.	77	7·6	8·0	1	68	..	8	..	..	5	..
Perle	Cherbourg	Bldg.	77	7·6	8·0	1	68	..	8	..	..	5	..
Phoque	Rochefort	Bldg.	77	7·6	8·0	1	68	..	8	..	..	5	..
Protée	Cherbourg	Bldg.	77	7·6	8·0	1	68	..	8	..	..	5	..
Silure‡	Cherbourg	1901	111·6	12·0	5·4	1	106–206	250	8–12	..	2	11	..
Sirène‡	Cherbourg	1901	111·6	12·0	5·4	1	106–206	250	8–12	..	2	11	..
Souffleur	Toulon	Bldg.	77	7·6	8·0	1	68	..	8	..	..	5	..
Thon	Toulon	Bldg.	77	7·6	8·0	1	68	..	8	..	..	5	..
Triton‡	Cherbourg	1901	111·6	12·0	5·4	1	106–206	250	8–12	..	2	11	..
Truite	Toulon	Bldg.	77	7·6	8·0	1	68	..	8	..	..	5	..
3 Experimental‡ Q 35, Q 36, Q 37	Cherbourg, Rochefort, Toulon	Bldg.											

‡ Submersible boats. Thirty-one other submarine boats, Q 38 to Q 68, are in the list of new constructions, 1902, as part of the programme.

Germany.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
D 1, D 2 (2 boats)	Elbing	1887	180·6	21·6	9·8	2	250	1,800	19	6 1-pr. revs.	3	48	50
D 3, D 4 (2 boats)	Elbing	1888	184	21·8	9·6	2	300	2,000	20	4 6-pr. Q.F. 2 1-pr. revs.	3	48	90
D 5, D 6 (2 boats)	Elbing	1888–9	190·3	23	9·6	2	320	3,000	22½	4 6-pr. Q.F. 2 1-pr. revs.	3	48	90
D 7, D 8 (2 boats)	Elbing	1890	190·3	23	9·9	2	350	3,500	22½	6 Q.F.	3		
D 9	Elbing	1894	197·0	24·3	9·9	2	380	4,500	26	6 Q.F.	3		
D 10	Chiswick	1898	211·9	19·6	8·1	2	310	5,800	28·5	5 3-pr. Q.F.	3	52	80
D 11, D 12	Chiswick	1990	218·6	20·9	8·7	2	333	7,000	31	1·12 pr. 5·6 prs.	2	59	40
S 96–101	Elbing	1900	206·8	22	8·9	2	350	6,000	27·5	3 3-pr. Q.F.	3		
S. 102–107 G 102–107 G 108–113	Kiel(Germania)	1901 Bldg 1901–2	206·8	22	8·9	2	350	5,400	27·5	3 3-pr. Q.F.	3		
Taku *	Elbing	1898	193·7	21·0	..	2	280	6,000	35	6·3 prs.	2	..	67
FIRST CLASS—													
S 1—S 65 (64 boats)†	Elbing	1883–92	121 / 150	15·7 / 15·6	6·7 / 6·7	..	85–88	900 / 1,600	20–22½	2 1-pr. revs.	2	..	17
S 66—S 73 (10 boats)	Elbing	1893	154·3	16·4	..	2	110 / 145	1,600	..	..	3		
S 74—S 81 (8 boats)	Elbing	1894	154·3	16·4	..	2	125	1,900	25	..	3		
S 82—S 87 (6 boats)	Elbing	1897–8	158·2	16·9	9·0	2	140	2,300	26	2 1-pr. revs.	3	..	32
G 88—G 89 (2 boats)	Kiel(Germania)	1898	154·3	16·5	..	..	160	2,500	26	2 mach.	3	22	
G 90—G 95 (6 boats)	Elbing	1899	157·5	16·9	8·9	2	155	..	25	1 Q.F., 1 m.	3	..	30
V 1, V 2 (2 boats)	Stettin	1884	124·6	..	..	..	75	550	..	..	2		
V 3, V 4 (2 boats)	Stettin	1884	..	..	..	..	90	1,000	..	..	2		
V 5—V 10 (6 boats)	Stettin	1884	..	..	..	..			19	..	2		
G 1,	Gaarden	1885	124·6	15·7	6·6	..	88	1,000	19	2 1-pr. revs.	2	17	
Y 1,	Poplar	1884	120	12·5	5·5	1	65	650	19	2 1-pr. revs.	2	15	25
T 1, T 2 (2 boats)	Chiswick, &c.	1884	117·7	12·5	6·2	1	80	..	20	2 1-pr. revs.	2	15	22
H 1,	Kiel (Howaldt)	1886	..	..	..	..	80	1,000	20·2	2 1-pr. revs.	2		
K 1,	Kiel (Dockyard)	1887	118·1	13·4	5·9	..	85	1,000	22	2 1-pr. revs.	..	18	
SECOND CLASS—													
3 boats	..	1893	..	..	..	..	88	..	22				
2 boats	..	1893	..	..	..	..	90	..	3				
VEDETTE BOATS—													
13 boats	..	..	..	..	..	..	13·5	..	18				
2 boats	..	..	..	..	..	..	..	..	16				
1 boat	Chiswick	1884	63	8	4·3	1	..	..	15·5	1 mach.	2		

* Ex Hai Ching, captured from the Chinese at Taku, 1900. † S 41 lost 1895.
The Estimates of 1901 provide the initial expenditure for the building of a division of torpedo boats.

Greece.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
6 boats	Stettin ..	1885	128	15·3	5·4	1	85	1,050	19	4 1-pr. revs.	..	20	20
6 boats .. .	Poplar.. ..	1881	100	12	4·2	1	48	600	19	2 1-pr. revs.	2	12	9
4 boats	La Seyne ..	1880	72	13	5·5	1	52	225	..	..	..	..	10
5 boats	La Seyne ..	1881	89	11	3·1	1	35	500	17·5	..	..	..	5
20 boats	Various ..	..	..	..	..	..	..	..	..	..	sp.	..	..

It is stated that 4 destroyers and 6 torpedo boats have been ordered from Italian firms.

Italy.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Fulmine	Sestri (Odero)	1898	200	20·4	5·4	2	298	4,800	28	1 12-pr. 3 6-pr. Q.F.	3	43	60
Lampo Freccia Dardo Strale Euro Ostro	Elbing (Schichau)	1899 1901	196·8	21·3	5·8	2	320	6,000	30	1 12-pr. Q.F., 5 6-pr.	2	53	60
Nembo Turbine Aquilone Borea Meteoro Tuono	Naples (Pattison)	1901 1902	208	19·4	6·3	2	330	6,000	30	1 12-pr. Q.F., 3 6-pr.	2	53	60
FIRST CLASS—													
5 boats: Aquila, Sparviero, Nibbio, Avvoltoio, Falco	Elbing ..	1888	152	17·2	7·9	2	130	2,200	26·6	2 3-pr. Q.F., 1 1-pr. Q.F., 1 1-pr. rev.	3	24	40
Nos. 78, 79 (2 boats)	Venice ..	1887	135	14	5·3	2	110	1,600	24	1 1-pr. Q.F., 1 1-pr. rev.	3	20	24
Pellicano	Sestri (Odero)	1899	157·4	19	14·8	2	147	2,700	25	2 3-prs.	2	28	24
Condore	Sestri (Ansaldo)	1898	154·3	16·8	6·9	2	136	2,500	27	2 3-prs.	2	27	16
SECOND CLASS—													
Nos. 76, 77 (2 boats)	Poplar.. ..	1887	140	14	5	2	100	1,600	25	2 3-pr. Q.F., 1 1-pr. rev.	4	20	24
Nos. 78, 79 (2 boats)	Venice ..	1896	..	..	..	..	..	..	..	..	3	20	24
Nos. 80–104, 106–111 (31 boats)	Elbing and Italy ..	1887–88	127·7	15·6	6·8	1	85	1,000	22·5	2 1-pr. Q.F	2	17	17
Nos. 112–116, 118–135 (23 boats)	Elbing and Italy ..	1889–92	127·7	15·6	6·8	1	85	1,100 1,200	23	..	2	17	17
No. 117	..	1895	131·2	16·4	..	1	85	1,000	..	2 1 pr. Q.F.	2	17	17
Nos. 136–146 (11 boats)	Italy	1893–94	131·2	16·4	..	1	85	1,000	22	2 1-pr. Q.F.	2	17	17
Nos. 147–153 (7 boats)	Italy ..	1894–5	131·2	16·4	..	1	85	1,000	22	2 1-pr. Q.F.	2	17	17
Nos. 60–75 (15 boats)	Elbing and Italy ..	1885–87	127·7	15·6	6·8	1	65	1,000	22·5	2 1-pr. Q.F.	2	17	17
THIRD CLASS—													
No. 22	Poplar.. ..	1882	100	12·5	5·5	1	40	620	22	1 1-pr. rev.	2	11	7
No. 25	Poplar.. ..	1882	100	12·5	5·5	1	40	620	22	1 1-pr. rev.	2	11	7
Nos. 26–59 (34 boats)	Chiswick and Italy ..	1882–86	100	11·7	5·3	1	34	430	21·3	1 1-pr. rev.	2	11	7
Nos, 23, 24 (2 boats)	Chiswick ..	1881	92	10·5	4·9	1	33	470	21·8	1 1-pr. rev.	2	11	7
FOURTH CLASS.													
No. 1	Chiswick ..	1878	78·8	9·8	3	1	19	173	19	..	2	10	
No. 2	Poplar.. ..	1879	86	11	4·5	1	25	420	21	1 1-pr. rev.	2	10	
No. 18	Chiswick ..	1883	62·4	7·5	2·5	1	10	170	17	1 1-pr. rev.	2	10	
No. 11	Leghorn ..	1883	75·6	9·9	3·8	1	31	250	19·2	..	2	10	
SUBMARINE—													
Delfino	Spezia	1895	79·2	9·1	..	..	95 107	..	10·0	1 1-pr. rev.	2	8	

The new Italian destroyers have Thornycroft water-tube boilers. Provision is made for other destroyers in 1902.

Japan.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Murakumo	Chiswick ..	1898	210·0	19·5	7·2	2	285	5,800	30 to 30·55	1 12-pr., 5 6-prs.	2	54	80
Shinonome	Chiswick ..	1898											
Yugiri	Chiswick ..	1898											
Shiranui	Chiswick ..	1899											
Kagerou	Chiswick ..	1899											
Usugumo	Chiswick ..	1900											
Shirakumo	Chiswick ..	1901	216·7	20·7	8·3	2	..	7,400	31	1 12-pr., 5 6-prs.	2	59	96
Asashio	Chiswick ..	1902											
Ikadsuchi	Poplar.. ..	1898	220·0	20·6	9·6	2	400	6,000	31·03 to 31·38	1 12-pr., 5 6-prs.	2	55	95
Inadsuma	Poplar.. ..	1899											
Akebono	Poplar.. ..	1899											
Sazanami..	Poplar.. ..	1899											
Oboro	Poplar.. ..	1899	220·3	20·6	9·6	2	307	6,000	31·62	1 12-pr., 5 6-prs.	2	..	90
Niji	Poplar.. ..	1899	220·3	20.6	9·6	2	308	6,000	31·15	1 12-pr., 5 6 -prs.	2	..	90
Kasumi	Poplar.. ..	Bldg.	220·3	20·6	9·6	2	320	6,000	31	1 12-pr., 5 6-prs.	2	..	..
Akatsuki													
Harusame	Yokosuka ..	Bldg.	220·3	20·6	9·6	2	320	6,000	31	1 12-pr., 5 6-prs.	2	..	..
Muvasame	Yokosuka ..												
Hayatori	Yokosuka ..												
Asagiri	Yokosuka ..												
FIRST CLASS—													
Kotaka	Poplar.. ..	1886	170	19·6	5		190	1,400	19	4 mach.	6	..	
13 boats	Creusot ..	1889	114·7	10·6	6	2	56	525	20	2 1-prs.	..	16	50
7 boats	Kobe	1889	114·7	10·6	6	1	56	525	20	2 1-prs.	..	16	
4 boats	Poplar.. ..	1879	100	12·5	..	1	40	620	20	..	..	..	
1 boat (No. 24) ..	Normand ..	1891	118	13·1	6·9	1	80	1,200	23	2 1-prs.	2	21	10
10 boats	Kobe	1891 & Bldg.	..	..	..	1	152	..	..	..	..	..	24
2 boats	Normand ..	1898	121·4	13·6	8·6	1	86	1,800	27	1 3-pr.	2	..	10
Hayabusa..	Normand ..	1898	147·7	16·0	8 2	2	150	4,200	30	3 3-prs.	3		13
Kasasagi	Normand ..	1899											
Manadzuru	Normand ..	1899											
Chidori	Normand ..	1900											
Shirataka..	Elbing ..	1899	..	..	..	..	125	..	28	..	..	..	..
2 boats*	Kobe	1901	..	..	..	..	83	..	..	..	..	..	..
10 boats	Poplar.. ..	1900	152·6	15·3	7·9	..	..	1900	27	2 3-prs	3	..	36
SECOND CLASS—													
16 boats	Elbing ..	1891–9	..	..	..	..	..	..	..	..	..	..	..

* Materials sent out by Schichau (Nos. 60 and 61).

Mexico.

Mexico has five first-class boats building or projected.

Norway.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Lyn	..	1882	94·2	9·7	2·5	1	36	430	18	..	1	..	3
Od	..	1882	97·5	11	5·6	1	40	450	18	..	1	..	3
Orm, Otter (2 boats)	..	1887	108·2	12·2	5·6	1	40	500	20	..	2	..	3
Pil, Rask (2 boats)..	..	1887	101·7	11·8	5·6	1	40	500	20	..	2	..	3
Snar	..	1887	104·9	11·8	5·6	1	40	500	20	..	2	..	3
Springer	..	1887	97·5	11·6	5·6	1	40	450	19	..	2	..	3
Varg (8), Raket (9)	Christiania..	1894	111·5	12·4	..	1	43	..	..	..	2	..	..
Hval, Delfin, Hai (3 boats)	Elbing ..	1896	128·0	15·0	..	1	84	1,100	24·5	2 1·4-in.Q.F.	2	..	..
Storm, Ovrand, Trods	Christiania	Bldg.	128·0	15·0	..	1	84	1,100	23	2 1·4-in.Q.F.	2		
SECOND CLASS—													
Rasp	Chiswick ..	1873	58	7·5	3·9	1	16	..	18	..	2		
Ulven	..	1878	56	..	..	1	16	..	9	..	sp.		
2 boats	..	Bldg.	..	..	..	..	20	..	12	..	..		

Netherlands.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Ardjoeno	Poplar.. ..	1886	125	13	6	1	83	80	21	2 1-prs.	2	16	10
Batok	Amsterdam	1887	125	13	6·9	1	83	725	20	2 1-prs.	2	16	10
Cycloop	Amsterdam	1887	125	13	6·9	1	83	680	20	2 1-prs.	2	16	10
Dempo	Amsterdam	1887	125	13	6·9	1	83	760	20	2 1-prs.	2	16	10
Empong	Poplar.. ..	1888	128	13	6·2	1	91	1,100	24·1	2 1-prs.	3	16	15
Etna	Poplar.. ..	1882	100	12·6	5·6	1	45	550	21·5	2 1-prs.	2	16	7
Foka	Amsterdam	1888	128	13	6·2	1	90	1,000	22·1	2 1-prs.	3		
Goentoer	Amsterdam	1888	128	13	6·2	1	90	950	21	2 1-prs.	3		
Habang	Amsterdam	1888	128	13	6·2	1	90	930	21·7	2 1-prs.	3		
Hekla	Poplar.. ..	1882	100	12·6	5·6	1	45	550	21·5	2 1-prs.	2	16	7
Idjen	Amsterdam	1889	128	13	6·2	1	90	840	20·6	2 1-prs.	3		
Krakatau	Amsterdam	1889	128	13	6·2	1	90	750	19·1	2 1-prs.	3		
Lamongan	Amsterdam	1890	104·5	13·3	5·2	1	50	790	20·7	2 1-prs.	2		
Makjan	Amsterdam	1890	104·5	13·3	5·2	1	50	790	20·7	2 1-prs.	2		
Nobo	Amsterdam	1890	104·5	13·3	5·2	1	50	790	20·7	2 1-prs.	2		
Scylla	Poplar.. ..	1900	130	13·6	6·0	1	77	1,200	24.3	2 1-prs.	3	18	20
Hydra	Poplar.. ..	1900	130	13·6	6·0	1	77	1,200	24 4	2 1 prs.	3	18	20
Ophir	Poplar.. ..	1901	152·6	15·3	7·9	1	130	1,900	27	2 3-prs.	2	25	36
Pangrango	Poplar.. ..	1901	152·6	15·3	7·9	1	130	1,900	27	2 3-prs.	2	25	36
Rindjani	Poplar.. ..	1901	152·6	15·3	7·9	1	130	1,990	27	2 3-prs.	2	25	36
SECOND CLASS—													
Nos. 1, 2, 4–20 (19 boats)	Chiswick, etc.	1878–86	{ 76 79 }	10·3	5·2	1	29	250	18	1 1-pr.	2 sp	..	3
Nos. 3,21,2 (3 boats)	..	1890	83·6	10·5	5·1	1	37	460	17·9	1 1-pr.	1	..	3
1 boat	East Cowes	1883	45·5	9·7	..	1	..	..	12	1 mach.	1		
INDIAN FLEET—													
Cerberus	Flushing ..	1888	125	13	6·9	1	83	912	21·2	2-1 prs.	..	16	
1 boat	..	1891											
3 boats	..	1893–94	125	..	..	..	83	..	21·5	..	2		

All the Poplar destroyers have Yarrow water-tube boilers, and the later ones are fitted for the consumption of oil fuel.

Portugal.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
5 boats (5–9)	Elbing ..	1890–92											
Espadarte (1)	Poplar.. ..	1881	86	11	5	1	31	450	19·7	2 mach.	2	10	10
Nos. 2, 3, 4 (3 boats)	Poplar.. ..	1886	120	12·5	5·5	1	60	700	20	2 mach.	2	16	18
Fulminante	Blackwall ..	1880	75	15	2·6	2	40	150	11·5	2 mach.	..	..	8
1 boat	..	..	..	..	..	..	25						
Mineiro	Lisbon ..	1893	..	..	..	..	..	..	12				
SUBMARINE—													
Plongeur	..	1892	72·1	11·5	..	..	..	..	6				

Roumania.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Naluka	Havre	1888	120·7	11·3	6·9	1	56	578	21	1 1-pr. rev.	2	..	12
Sborul	Havre	1888	120·7	11·3	6·9	1	56	578	21	1 1-pr. rev.	2	..	12
Smeul	Havre	1888	120·7	11·3	6·9	1	56	578	21	1 1-pr. rev.	2	..	12
SECOND CLASS—													
Soimul	Poplar.. ..	1882	63	8	3	1	12	150	16·5	..	..	8	1
Vulturul	Poplar.. ..	1882	63	8	3	1	12	150	16·5	..	..	8	1

Russia.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
BALTIC SEA.													
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Sokol	Poplar.. ..	1895	190	18·6	7.0	2	240	4,400	29.7	1 12-pr. 3 6-pr.	2		
Krechet, Korshun (2 boats)	Abo	1898	198 10	18·6	7·0	2	240	3,800	27·5				
Iastreb	Ishora	1898	196·9	18·4	11·5	1	240	3,800	27	1 2·8-in.	2		
Nyrok	Ishora . ..	1898	196·9	18·4	11·5	1	240	3,800	27	3 1·8-in.	2		
Berkout	Ishora.. ..	1898	196·9	18·4	11·5	1	240	3,800	27	3 1·8-in.	2		
Condor	Ishora	1898	196·9	18·4	11·5	1	240	3,800	27	3 1·8-in.	2		
5 boats	Ishora.. ..	Bldg.											
Kit, Skat, Delphin, Kassatka (4 boats)	Elbing ..	1899	196·9	18·4	11·5	1	350	6,000	27	1 12-pr, 5 3-pr	2		
Ossetr, Kephal, Losos	Havre (F &C.)	1900–2	186·0	20·8	10·3	2	300	5,000	27	1 12-pr, 5 3-pr	2	..	80
Forel, Sterliad ..	Havre (Normand) ..	1900–1	186·0	20·8	10·3	2	300	5,000	27	1 12-pr, 5 3-pr	2	..	80
Gagara, Voron, Filin, Sova	Nevsky ..	1899	..	..	..	1	240	..	29	1 12-pr, 5 3-pr	..	55	53
Som	Birkenhead	1899	213	21·5	12·9	1	370	6,000	28				
Lebed, Pelikan, Pavlin, Fasan ..	Creighton ..												
Drozd, Diatel, Baklan, Bekass, Gorlitza, Gratch, Kulik, Perepel, Skvoretz, Strige, Shtchegol	Nevsky and Ishora ..	1900–2 & Bldg.	..	..	..	..	350	6,000	30	1 12-pr, 5 3-pr			
‡Lieut. Burukoff ..	Elbing ..	1898	193·7	21·0	..	2	280	6,000	35	6 3-pr. Q.F.	2	..	67
FIRST CLASS—													
Aspen	Ishora.. ..	1895	127·9	15·7	6·9	1	98	1,250	21	..	2	..	17
Abo	Elbing ..	1886	128	15·7	7·5	1	87	900	22·2	4 1-pr. revs.	2	13	17
Bjerke	Putiloff ..	1890	136·5	13	7·8	..	81	1,100	21				
Dago	Abo	1891	152	13	8·3	..	100	1,000	19				
Domeness	Putiloff ..	1895	127·9	15·7	6·9	1	98	1,250	21	..	2	..	17
Eckness	Abo	1890	136·5	13	7·8	..	81	1,100	21				
Hapsal	Putiloff ..	1891	126	13	8·5	1	81	1,100	21	2 1-pr. revs.	2	13	
Hogland	Ishora . ..	1894	128	16	6·9	1	85	1,200	22	2 1-prs.	2	13	17
Kotka	Abo	1891	152	13	8·3	..	100	1,000	19				
Kotlinj	St. Petersburg	1885	124·2	12·9	5·9	2	67	500	16·5	2 1-pr. revs.	2	16	15
Kronschlot	Ishora.. ..	1891	152	13	8·3	..	100	1,000	19				
Lachta	Elbing ..	1886	128	15·7	7·5	1	87	900	20	4 1-pr. revs.	2	13	17
Libawa	Elbing ..	1886	128	15·7	7·5	1	87	1,000	22	4 1-pr. revs.	2	13	17
Louga	Elbing ..	1886	128	15·7	7·5	1	87	900	20	4 1-pr. revs.	2	13	17
Moonsund	Putiloff ..	1891	126	13	8·5	1	81	1,100	21	2 1-pr. revs.	2	13	
Nargen	Ishora.. ..	1894	128	16	6·9	1	85	1,200	22	2 1-prs.	2	13	17
Narwa	Elbing ..	1886	128	15·7	7·5	1	87	900	20	4 1-pr. revs.	2	13	17
Nyrok	Ishora	1898											
Pernoff	Normand ..	1892	157·9	14·9	6·8	2	120	1,600	25	2 3-prs.	2	26	16
Rochensalm	Putiloff ..	1890	136·5	13	7·8	..	81	1,100	21				
Seskar	Ishora.. ..	1891	152	13	8·3	..	100	1,000	19				
Sestoretsk..	Normand ..	1894	118	13·2	8·6	1	80	1,300	24	2 1-prs.	2	21	10
Tosna	Putiloff ..	1893	127·9	15·7	6·9	1	98	1,250	21	..	2	13	17
Trausund	Ishora.. ..	1895	127·9	15·7	6·9	1	98	1,250	21	..	2	..	17
Viborg	Clydebank ..	1886	144·5	17	8·1	2	126	1,400	20	2 3-pr. revs.	3	24	45*
Vindawa	Elbing ..	1886	128	15·7	7·5	1	87	900	21	4 1-pr. revs.	2	13	17
Vzriw	St. Petersburg	1877	118	16	10·9	1	160	800	14·5	4 Q.F.	1	18	16
8 boats	St. Petersburg	1894	128	16	6·9	1	85	1,200	22	2 1-prs.	2	13	17
2 boats	Putiloff ..	1894	138	14·7	9·9	2	118	..	25	2 mach.	2	26	
2 boats	St. Petersburg	1896	128	16	6·9	2	85	1,200	22	2 1-prs.	2	13	17
6 boats	St. Petersburg	1897	138	14·7	9·9	2	120	..	25	..	2	26	
†8 boats	Nevsky ..	1898	..	..	..	..	118						
Akula, Buichok	Nevsky and Ochta ..	1901	147·8	13·0	..	2	150	4,200	25	2 1-prs.	1		
Makrel, Naiim, Okun, Plotva, Peskar, Keta, Paltus, Sig, Buichok	Nevsky and Ochta ..	Bldg.	147·8	13·0	..	2	150	4,200	25	2 1-prs.	1		
SECOND CLASS—													
21 boats (Galka class)	Elbing and Russia ..	1880 &c	74·7	8·9	5	1	30	220	16	..	2	14	3
21 boats (Woron class)	Elbing and Russia ..	..	66	11·1	..	1	..	260	17				
1 boat	Poplar.. ..	1888	60	8·5	3	1	16	240	17·5	..	2	..	1
BLACK SEA.													
FIRST CLASS—													
A. B. C. (3 boats) ..	Nicolaieff ..	1893	126	..	..	..	81	..	21				
Adler..	Elbing ..	1890	152·0	17·2	7·9	2	130	2,200	27·4	2 1-prs.	3	24	40
Anakria	Elbing ..	1890	128·0	16	6·9	1	85	1,200	22	2 1-prs.	2	13	17
Anapa	Odessa.. ..	1891	126	13	8·5	1	81	1,100	21	2 1-pr. revs.	2	13	
Aitodorj	Odessa.. ..	1891	126	13	8·5	1	81	1,100	21	2 1-pr. revs.	2	13	
Batoum	Poplar.. ..	1880	100	12·5	5·5	1	40	500	22	2 1-pr. revs.	2	12	9
D. E. (2 boats) ..	Sebastopol ..	1893	128	..	..	..	85	..	22				
Gagri	Claparède ..	1883	120·6	13·3	7	1	78	600	18	2 1-pr. revs.	2	13	12
Gelendshik	La Seyne ..	1883	122·7	12·4	6·2	1	73	560	18	2 1-pr. revs.	2	13	11
Ismail	Nicolaieff ..	1886	128	15·7	7·5	1	87	900	20	2 1-pr. revs.	2	13	17
Itzvar	Odessa.. ..	1891	..	..	..	..	81	1,100					
Kodor	Elbing ..	1886	128	15·7	7·5	1	87	900	21	4 1-pr. revs.	2	13	17

* Has received liquid fuel apparatus. † Pernoff type. ‡ Captured from the Chinese at Taku, 1900.

A submarine boat from the plans of Lieut. Kolbasieff and Engineer Kuleinikoff has begun her trials.

Russia—*continued.*

Name or Number.	Where Built.	Launched	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons
BLACK SEA—*contd.*													
FIRST CLASS—*contd.*													
Kilia	Elbing ..	1886	128	15·7	7·5	1	87	900	22	4 1-pr. revs.	2	13	17
Novorossisk	Elbing .	1886	128	15·7	7·5	1	87	900	22	4 1-pr. revs.	2	13	17
Poti	Normand ..	1883	124·8	11·0	7·0	1	62	550	18	2 1-pr. revs.	2	13	10
Reni	Elbing ..	1886	128	15·7	7·5	1	87	900	22	4 1-pr. revs.	2	13	17
Sookhoum	Chiswick ..	1883	113	12·5	6	1	64	700	19.5	2 Nords.	2	13	10
Tchardak	Elbing ..	1886	128	15·7	7·5	1	87	900	20	4 1-pr. revs.	2	13	17
Yalta..	Elbing ..	1886	128	15·7	7·5	1	87	900	22	4 1-pr. revs.	2	13	17
3 boats	Elbing ..	1886	128	15·7	7·5	1	87	900	22	4 1-pr. revs.	2	13	17
4 boats	Nicolaieff ..	Bldg.	..	..	..	..	..	..	..	..	..	..	..
SECOND CLASS—													
Istcheritza	Sebastopol ..	1878	62·3	9·7	3·9	1	24	220	15	..	..	10	
Karabin	Elbing.. ..	1877	64·3	8·4	2	1	11	120	15	..	..	8	
Kefal..	Chiswick ..	1880	60·5	7·5	3·5	1	..	..	16·8	..	..	8	
Scheglensk	Sebastopol ..	1878	59·3	9·5	3·9	1	24	220	15	..	..	10	
Schehouka	Sebastopol ..	1878	59·3	9·5	3·9	1	24	220	15	..	..	10	
Scoombia	Odessa.. ..	1878	64·3	10	4	1	25	220	15	..	..	10	
Soroka	St. Petersburg	1878	62.3	9·7	3·9	1	24	220	15	..	..	10	
Soulin	..	1877	60	9·7	3·9	1	24	210	15	..	..	10	
Sultanka	Odessa.. ..	1878	64·3	10	4	1	25	220	15	..	.	10	
1 boat	Poplar	1877	75	10	..	..	..	..	..	..	..	..	
50 boats(WoronClass)	Elbing, etc.	..	66	11·1	..	1	..	260	17				
3 boats	Nicolaieff ..	1898											
FAR EAST.													
Borgo	Abo	1890	136·5	13	7·8	..	81	1,100	21				
Forel..	..	..	71·5	6·5	3·3	1	23	220	16				
Jantchiche	Elbing.. ..	1887	128	15·7	11·5	..	87	970	19	4 1-pr. revs.	2	13	17
N.	..	1893	152·5	16·8	..	..	140	2,200	26·5	2 1-pr. revs.	3	24	40
N.	..	1893	152·5	16·8	..	..	140	2,200	26·5	2 1-pr. revs.	3	24	40
Podorosnik	..	..	71·5	6·5	3·3	1	23	220	16				
Revel	Normand ..	1886	151	12·5	8·4	1	102	800	20	2 1-pr. revs.	2	23	15
Sisik	..	..	71·5	6·5	3·3	1	23	220	16				
Skorpion	..	..	71·5	6·5	3·3	1	23	220	16				
Sootchena	Elbing.. ..	1887	128	15·7	11·5	..	87	970	19	4 1-pr. revs.	2	13	17
Sterliad	..	..	71·5	6·5	3·3	1	23	220	16				
Strauss	..	..	71·5	6·5	3·3	1	23	220	16				
Sunguri (*ex* Hogland)	Abo	1890	152	16	7·9	2	140	1,800	22				
Sweaborg	Normand ..	1886	151	12·5	8·4	1	102	800	20	2 1-pr. revs.	2	23	15
Ussuri (*ex* Nargen)	Abo	1890	152	16	7·9	2	140	1,800	22				
2 Unnamed	Ochtenski ..	Bldg.	152	16	7·9	2	140	1,800	22				

The destroyers Lieut. Burukoff, Kit, Skat, Delphin, Kassatka and Som are also in the Far East.
The Gorlitza and two others have been sent to Port Arthur in sections.

Spain.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—													
Terror	Clydebank ..	1896	220	22	5·6	2	300	6,000	28	2 12-pr. 2 6-pr. 2 1-pr.	2	67	100
Audaz													
Osado	Clydebank ..	1897	225	25·6	5·8	2	400	7,500	30	2 14-pr. 2 6-pr. 2 1-pr.	2	70	90
Proserpina													
FIRST CLASS—													
Acevedo	Chiswick ..	1885	117·7	12·5	6·2	1	63	660	20·1	2 mach.	2		
Ariete	Chiswick ..	1887	147·5	14·6	4·9	2	97	1,600	26·1	4 3-pr. Q.F.	2	..	25
Azor	Poplar.. ..	1887	134·5	14	6	1	108	1,600	24	4 3-pr. Q.F.	3	23	25
Bustamente	Normand ..	1887	126	10·9	..	..	63	800	..	3 3-prs.	2		
Habana	Chiswick ..	1887	127·5	12·5	6	1	59	730	21·3	1 mach.	2		
Halcon	Poplar.. ..	1887	134·5	14	..	1	108	1,600	24	4 3-pr. Q.F.	3	23	25
Julian Ordoñez ..	Chiswick ..	1885	117·7	12·5	6·2	1	65	660	20·1	2 1-in. Nord.	2		
Orion..	Gaarden ..	..	125	15·5	3·5	1	85	1,000	21·5	2 1-pr. revs.	2	18	16
Rayo..	Chiswick ..	1887	147·5	14·6	4·9	2	97	1,600	25·5	4 3-pr. Q.F.	2	..	25
VEDETTE BOATS—													
3 boats	East Cowes	1892	60	9·3	..	..	..	..	18.3				
SUBMARINE—													
Peral..	Carraca ..	1889	70	8·5	..	2	87	60	10				

It is stated that the Ejercito, Retamoso, Rigel, and Castor have been condemned..

Sweden.

Torpedo Boats.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
Destroyer—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Mode	Poplar.. .	Bldg.	220·0	20 6	8·9	2	400	6,000	31·0	1 12-pr. 5 6-prs.	2	55	95
First Class—													
Komet	Elbing ..	1896	128	15·9	6·11	1	92	1,056	23·0	2 1·9-in. Q.F.	2	16	17
Blixt..	Carlskrona..	1898	128	15·9	6·11	1	92	1,260	23·5	2 1·9-in. Q.F.	2	18	17
Meteor	Carlskrona..	1899	128	15·9	6·11	1	92	1,330	23·8	2 1·9-in. Q.F	2	18	17
Stjerna	Carlskrona..	1899	128	15·9	6·11	1	92	1,250	23·4	2 1·9-in. Q.F.	2	18	17
Orkan	Carlskrona..	1900	128	15·9	6·11	1	92	1,250	23·5	2 1·5-in. Q.F.	2	18	17
Vind	Carlskrona..	1900	128	15 9	6·11	1	92	1,250	23·5	2 1·5-in. Q.F.	2	18	17
Bris	Carlskrona..	1900	128	15·9	6·11	1	92	1,250	23·5	2 1.5-in. Q.F.	2	18	17
2 boats (A and B) ..	Carlskrona..	1901	128	15·9	6·11	1	92	1,250		2 1·5-in. Q F.	2	18	17
No. 1..	Chiswick ..	1884	113·2	12·2	6·3	1	65	620	18·5	1 mach.	2	16	11
2 boats (3 and 5) ..	Stockholm ..	1887	114·2	12·6	6·7	1	67	620	18·5	1 mach.	2	16	15
No. 7..	Stockholm ..	1887	114·2	12·6	6·7	1	67	620	18·7	1 mach.	2	16	15
2 boats (9 and 11) ..	Carlskrona..	1894	126·8	13·11	7·7	1	86	850	19·5	2 mach.	2	16	15
Second Class—													
No. 61	Stockholm ..	1882	91·6	11·8	5·7	1	40	350	16·0	1 mach.	1	14	9
No. 63	Chiswick ..	1883	100·1	11·10	5·11	1	45	420	19·0	1 mach.	2	14	7
No. 65	Stockholm ..	1885	100·1	11·10	5·11	1	45	420	19·0	1 mach.	2	14	9
No. 67	Stockholm ..	1886	100·9	11·10	6·1	1	46	430	19.2	1 mach.	2	14	9
No. 69	Stockholm ..	1886	100·9	11·10	6·1	1	46	450	19·9	1 mach.	2	14	9
No. 71	Stockholm ..	1887	103·4	11·10	6·7	1	58	460	18·6	1 mach.	2	14	9
No 73	Stockholm ..	1887	103·4	11·10	6·7	1	58	460	18·6	1 mach.	2	14	9
No. 75	Stockholm ..	1892	100·5	11·6	6·3	1	49	460	18·9	1 mach.	2	14	9
No. 77	Carlskrona..	1891	100·5	11·6	6·3	1	49	460	18·9	1 mach.	2	14	9
No. 79	Stockholm ..	Bldg.	104·0	12·5	6·1	1	49			1 1·5-in. Q.F.	2	14	
No. 81	Stockholm ..	Bldg.	104·0	12·5	6·1	1	49			1 1·5-in. Q.F.	2	14	
Third Class—													
Nos. 141, 143, 145, 147, 149 (5 boats) ..	Stockholm ..	1879 1890	55·0	10·7	4·1	2	21	80	10	..	2	..	1·5
Submarine—													
Unnamed	..	Bldg.	82·0	13·0	..	..	146	100	..	..	..	..	..

One first-class and two second-class boats are provided for in 1902.

Turkey.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes	Complement.	Coal Capacity.
Destroyers—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Berk-Efshan	Gaarden ..	1894	187	21·6	..	2	270	200	25	6 1-pr. revs.	2		
Tajjar	Gaarden ..	1894	187	21.6	..	2	270	..	25	6 1-pr. revs.	2		
2 boats	Sestri Ponente	1901	..	..	..	..	..	..	27·5				
First Class—													
A. B...	Sestri Ponente	1901	166	18·6	4·0	2	145	2,400	26	2·1 pr.	2	..	16
Edjder (No. 10) ..	Gaarden ..	1890	152·7	18·9	7·4	2	150	2,200	23	5 3-prs. Q.F.	2		
1 boat	Constantinople	1889	140	16	6·9	2	120	1,800	23	5 1-pr. revs.	2		
5 boats	Gaarden ..	1889–90	126·7	15·4	8·6	1	85	1,300	22	2 1-pr. revs.	2	21	8
Timsah	London ..	1887	126	15	..	..	..	..	21·7				
5 boats	Elbing ..	1886	120·3	16·2	..	..	85	900	21	2 Nords.	2	20	10
4 boats	Constantinople	1886–89	100·3	11·8	5·5	1	42	550	19·5	2 mach.			
Tewfik	Normand ..	1885	100·7	13	5·5	1	42	550	20				
2 boats	La Seyne and Constantinople	1885	100·7	13	5·5	1	42	550	20·3	2 Nords.			
2 boats	Teddington	1887	124	15	..	..	..	..	22				
2 boats	Kiel	1892	127	..	..	..	..	..	22				
Submarine—													
Abdul Hamid	Chertsey ..	1886	100	12	..	3	160	250	10	2 mach.	1	..	8
Abdul Medjid	Chertsey ..	1886	100	12	..	3	160	250	10	2 mach.	1	..	8

United States.

Name.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament. Guns.	Torpedo Tubes.	Complement.	Maximum Coal Capacity.
DESTROYERS—			ft. in.	ft. in.	ft. in.		Tons.		Knots.				Tons.
Bainbridge ..	Philadelphia	1901	245 0	23 7	6 6	2	420	8,000	29	2 12-pr., 5 6-pr.*	2	64	139
Barry	Philadelphia	1902	245 0	23 7	6 6	2	420	8,000	29	2 12-pr., 5 6-pr.	2	64	139
Chauncey.. ..	Philadelphia	1901	245 0	23 7	6 6	2	420	8,000	29	2 12-pr., 5 6-pr.	2	64	139
Dale	Richmond ..	1900	245 0	23 7	6 6	2	420	8,000	28	2 12-pr., 5 6-pr.	2	64	139
Decatur	Richmond ..	1900	245 0	23 7	6 6	2	420	8,000	28	2 12-pr., 5 6-pr.	2	64	139
Hopkins	Wilmington	1900	244 0	24 6	6 0	2	408	7,200	29	2 12-pr., 5 6-pr.	2	64	150
Hull	Wilmington	1900	244 0	24 6	6 0	2	408	7,200	29	2 12-pr., 5 6-pr.	2	64	150
Lawrence.. ..	Quincy, Mass.	1900	242 3	22 3	6 2	2	400	8,400	30	2 12-pr., 5 6-pr.	2	64	115
Macdonough ..	Quincy, Mass.	1901	242 3	22 3	6 2	2	400	8,400	30	2 12-pr., 5 6-pr.	2	64	115
Paul Jones ..	San Francisco	1900	245 0	23 7	6 6	2	420	7,000	29	2 12-pr., 5 6-pr.	2	64	139
Perry	San Francisco	1900	245 0	23 7	6 6	2	420	7,000	29	2 12-pr., 5 6-pr.	2	64	139
Preble	San Francisco	1901	245 0	23 7	6 6	2	420	7,000	29	2 12-pr., 5 6-pr.	2	64	139
Stewart	Morris Heights	1900	245 0	23 7	6 6	2	420	8,000	29	2 12-pr., 5 6-pr.	2	64	139
Truxtun	Baltimore ..	1901	248 0	23 3	6 0	2	433	8,300	30	2 12-pr., 5 6-pr.	2	64	232
Whipple	Baltimore ..	1901	248 0	23 3	6 0	2	433	8,300	30	2 12-pr., 5 6-pr.	2	64	232
Worden	Baltimore ..	1901	248 0	23 3	6 0	2	433	8,300	30	2 12-pr., 5 6-pr.	2	64	232
Bagley	Bath	1900	157 0	17 0	4 7	2	167	..	28	3 3-pr.	3	29	..
Bailey	Morris Heights	1899	205 0	19 0	6 0	2	235	5,000	30	4 6-pr.	2	..	20
Barney	Bath	1900	157 0	17 0	4 7	2	167	..	28	3 3-pr.	3	29	..
Biddle	Bath	1900	157 0	17 0	4 7	2	167	..	28	3 3-pr.	3	29	..
Blakely	Boston ..	1901	175 0	17 6	4 8	2	165	3,000	26	3 3-pr.	3	29	70
De Long	Boston ..	1901	175 0	17 6	4 8	2	165	3,000	26	3 3-pr.	3	29	70
Du Pont	Bristol, R.I.	1897	175 0	17 8	4 8	2	165	3,400	28·58	4 1-pr.	3	32	76
Farragut	San Francisco	1898	213 6	20 8	6 0	2	273	5,000	30	4 6-pr.	2	..	76
Foote..	Baltimore ..	1896	160 0	16 1	5 0	2	142	..	24·5	3 1-pr.	3	24	44
Goldsborough ..	Portland, Ore.	1899	194 8	20 5	5 0	2	247·5	..	30	4 6-pr.	2	..	131
Nicholson ..	Elizabethport	1900	174 6	17 0	4 6	2	174	..	26	3 3-pr.	3	29	..
O'Brien	Elizabethport	1900	174 6	17 0	4 6	2	174	..	26	3 3-pr.	3	29	..
Porter	Bristol, R.I.	1896	175 0	17 8	4 8	2	165	..	28·63	4 1-pr.	3	32	76
Rodgers	Baltimore ..	1896	160 9	16 1	5 0	2	142	2,000	24·5	3 1-pr.	3	24	44
Rowan	Seattle, Wash.	1898	170 0	17 0	5 11	2	182	3,200	26	4 1-pr.	3	32	60
Shubrick	Richmond ..	1899	175 0	17 6	4 8	2	165	3,000	26	3 3-pr.	3	29	70
Stockton	Richmond ..	1899	175 0	17 6	4 8	2	165	3,000	26	3 3-pr.	3	29	70
Stringham ..	Wilmington	1899	225 0	22 0	6 6	2	340	7,200	30	7 6-pr.	2	..	120
Thornton	Richmond	1900	175 0	17 6	4 8	2	165	3,000	26	3 3-pr.	3	29	70
Tingey	Baltimore ..	1901	175 0	17 6	4 8	2	165	3,000	26	3 3-pr.	3	29	70
Wilkes	Morris Heights	Bldg	175 0	17 6	4 8	2	165	3,000	26·25	3 3-pr.	3	29	70
Winslow	Baltimore ..	1897	160 0	16 1	5 0	2	142	2,000	24·5	3 1-pr.	3	24	44
SEA-GOING—													
Cushing	Bristol, R.I.	1890	138 9	14 3	4 11	2	105	1,720	22·5	3 1-pr.	3	23	36
Davis	Portland, Ore.	1898	146 0	15 4	5 4	2	132	1,750	22·5	3 1-pr.	3	..	..
Dahlgren	Bath	1899	147 0	16 4	4 7	2	146	4,200	30·5	4 1-pr.	2	..	32
Ericsson	Dubuque, Iowa	1894	149 7	15 6	4 9	2	120	1,800	24	4 1-pr.	3	23	35
Fox	Portland, Ore.	1898	146 0	15 4	5 4	2	132	1,750	22·5	3 1-pr.	3	..	..
Manly	Yarrow ..	..	..	..	..	..	..	..	..	..	..	..	..
Morris	Bristol, R.I.	1898	138 3	15 6	4 1	2	105	1,750	24	3 1-pr.	3	..	28
Somers	Schichau, Elbing ..	..	149 3½	17 5	..	2	145	..	..	..	..	..	..
T. A. M. Craven	Bath	1899	147 0	16 4	4 7	2	146	4,200	30·5	4 1-pr.	2	..	32
THIRD CLASS—													
Gwin..	Bristol, R.I.	1897	99 6	12 6	3 3	1	46	850	20·88	1 1-pr.	2	..	8
Mackenzie ..	Philadelphia	1898	99 3	12 9	4 3	1	65	850	20	1 1-pr.	2	..	15·3
McKee	Philadelphia	1898	99 3	12 9	4 3	1	65	850	19·82	2 1-pr.	2	..	..
Talbot	Bristol, R.I.	1897	99 6	12 6	3 3	1	46	850	21·15	1 1-pr.	2	..	8·8
Stiletto (wood)	Bristol, R.I.	..	88 6	11 0	3 0	1	31	359	18·22	..	2	..	4
SUBMARINE—													
Adder	Elizabethport	1901	63 4	11 9	..	1	120	160	7—8	..	1	..	..
Grampus ..	S. Francisco	Bldg.	63 4	11 9	..	1	120	160	7—8	..	1	..	..
Holland	Elizabethport	1896	54 0	10 3	..	1	74	45	8	1 dynamite	1	5	..
Moccassin ..	Elizabethport	1901	63 4	11 9	..	1	120	160	7—8	..	1	..	..
Pike	S. Francisco	Bldg.	63 4	11 9	..	1	120	160	7—8	..	1	..	..
Plunger	Baltimore ..	1898	85 3	11 6	..	1	168	70	7—8	..	2	..	..
Porpoise	Elizabethport	1901	63 4	11 9	..	1	120	160	7—8	..	1	..	..
Shark	Elizabethport	1901	63 4	11 9	..	1	120	160	7—8	..	1	..	..

* Guns of destroyers of this class are Driggs Semi-Automatic Quick-Firers.

The Barcelo and some other Spanish torpedo-boats were captured during the war.

With the exception of the Lawrence, Macdonough, and Stewart, all the destroyers in the first alphabetical list have Thornycroft water-tube boilers. The Farragut, Goldsborough and Stringham have also boilers of this type.

The submarine Fulton, of the Holland type, built experimentally by the Holland Company, was launched June, 1901.

PLANS

OF

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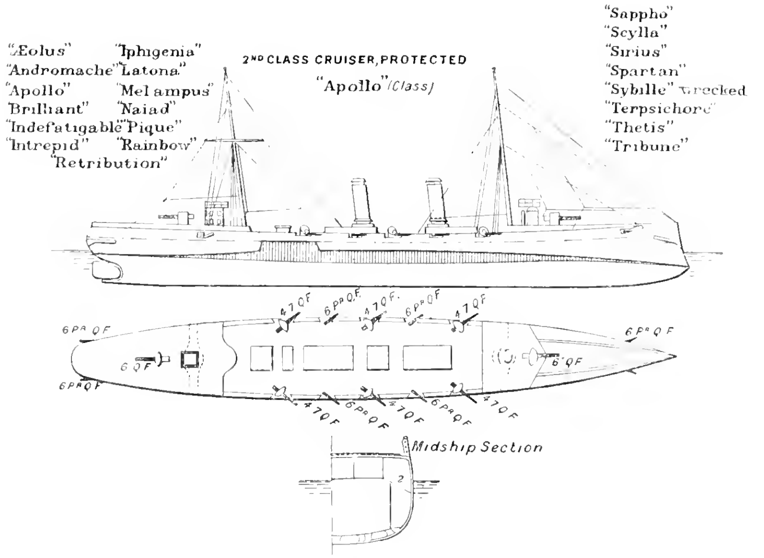


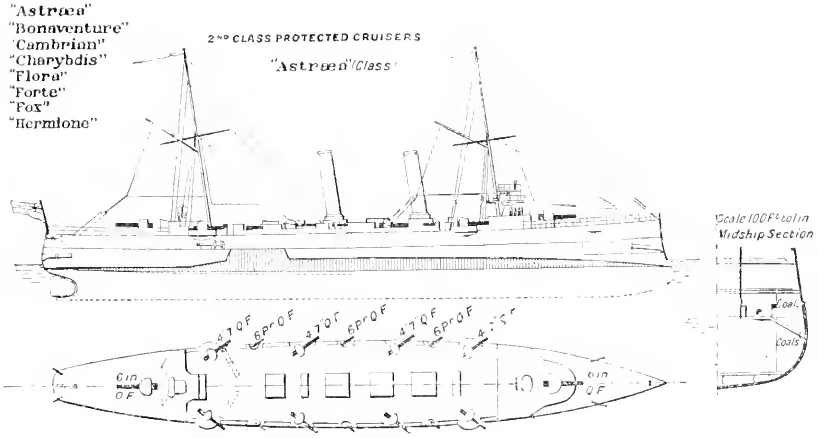
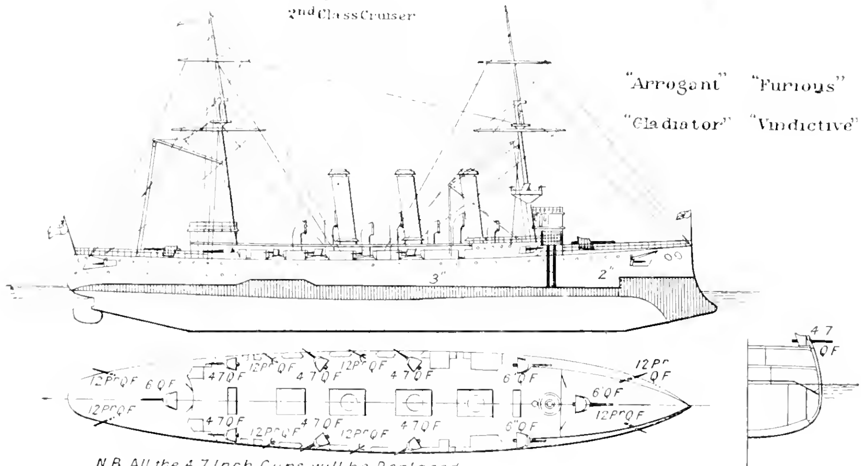
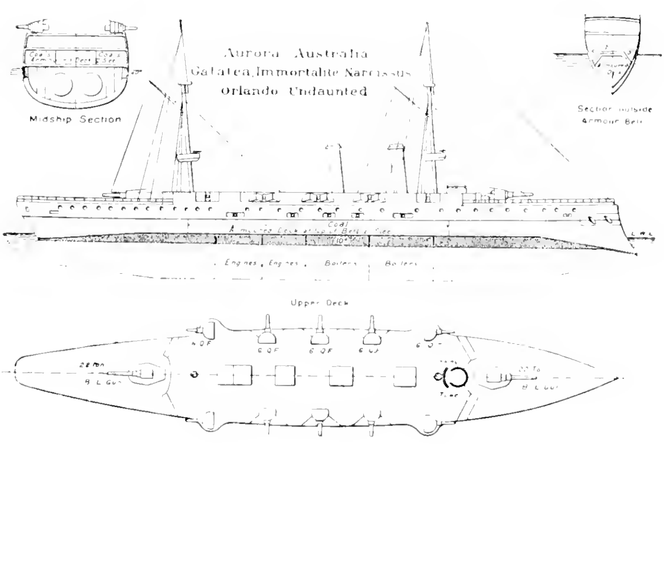


PLATE I.

b



N B All the 4 7 Inch Guns will be Replaced
with 6 Inch Guns



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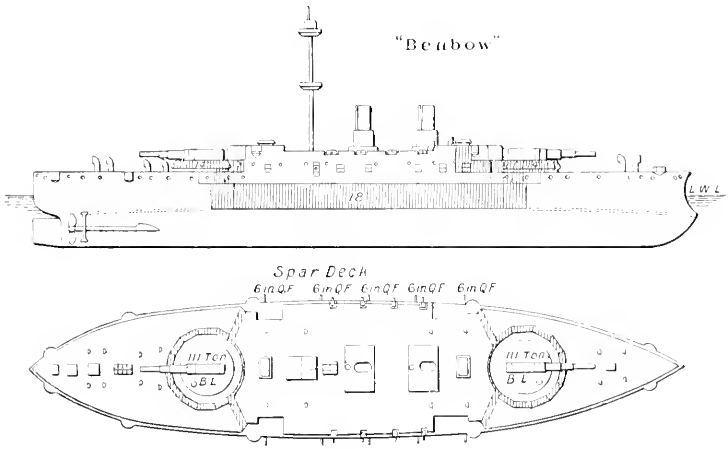

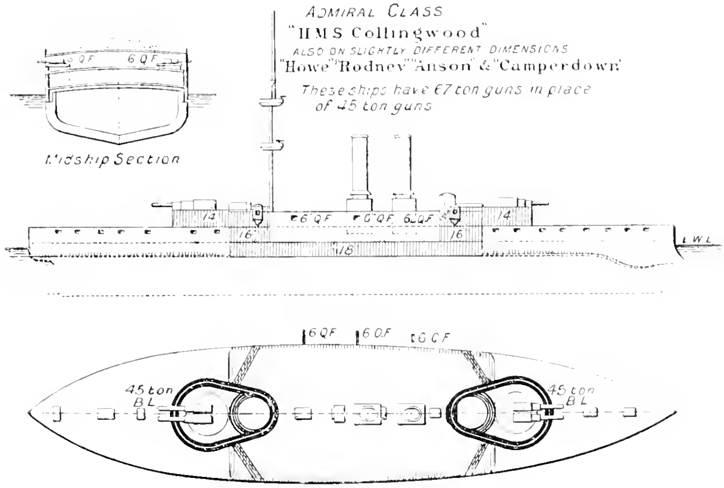

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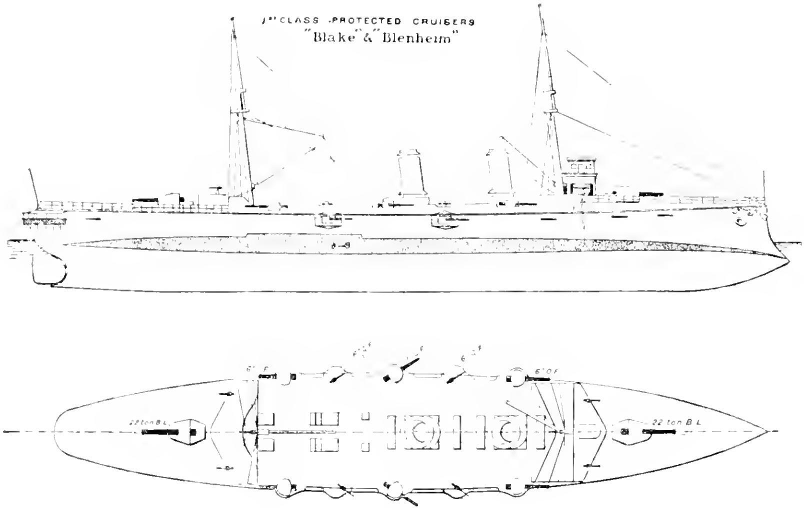
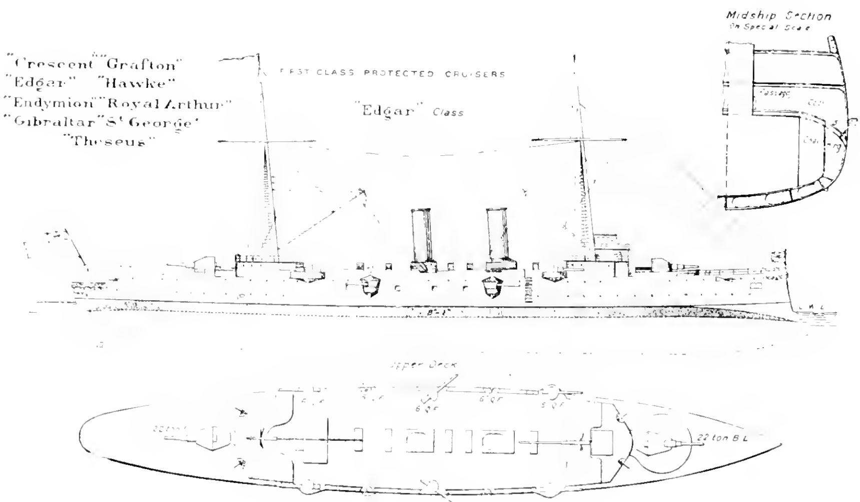
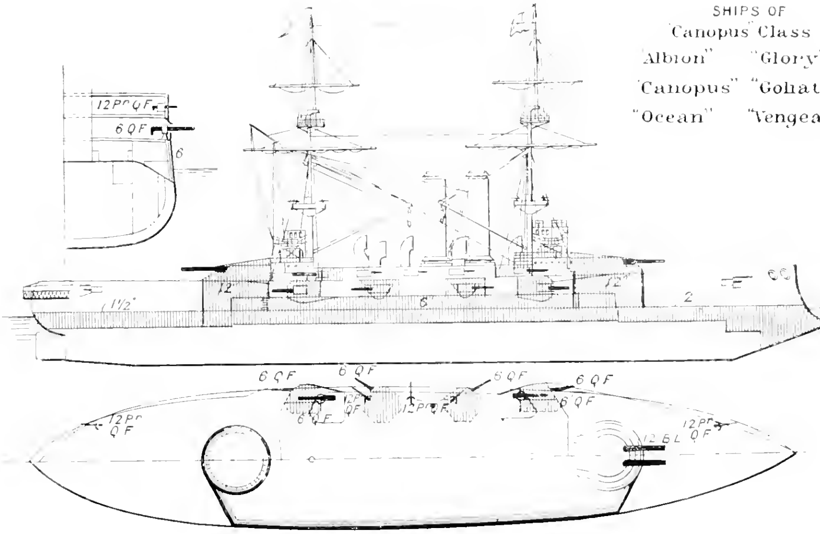




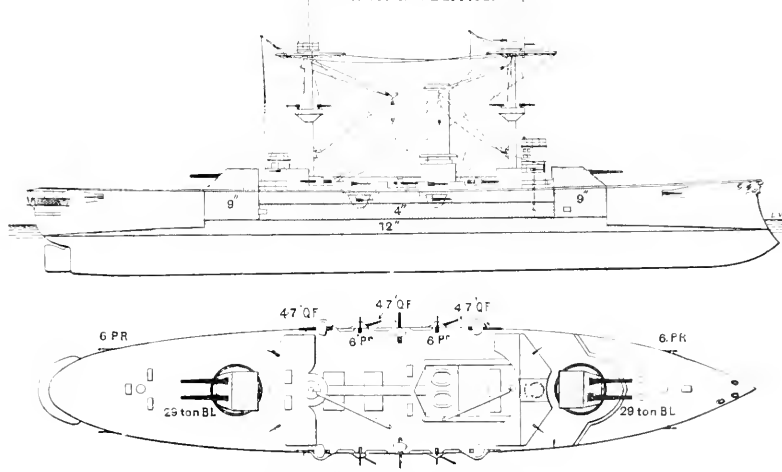
Note The Crescent and Royal Arthur have two 6 in guns forward in place of the 22 ton gun.

GREAT BRITAIN.

SHIPS OF
"Canopus" Class
"Albion" "Glory"
"Canopus" "Goliath"
"Ocean" "Vengeance"

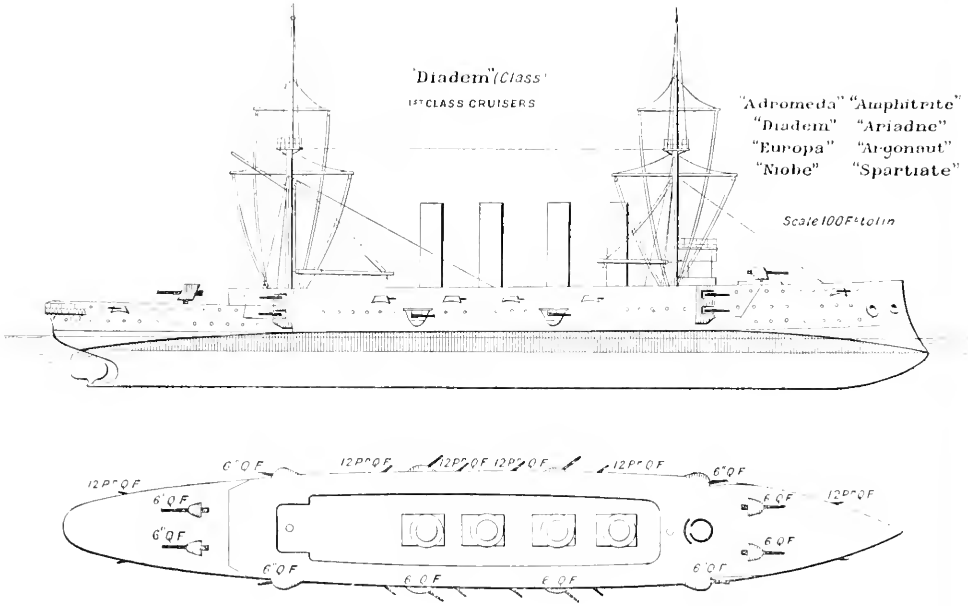


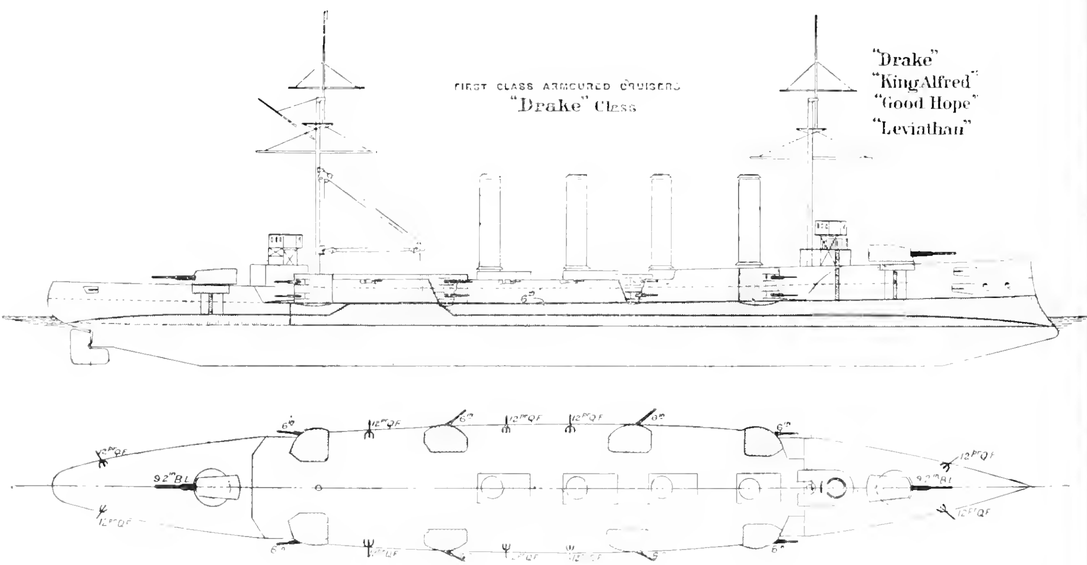
First Class Battle Ships
"Centurion" & "Barfleur"



N.B. All the 4·7 inch Guns will be replaced with 6 inch Guns in Casemates

GREAT BRITAIN.



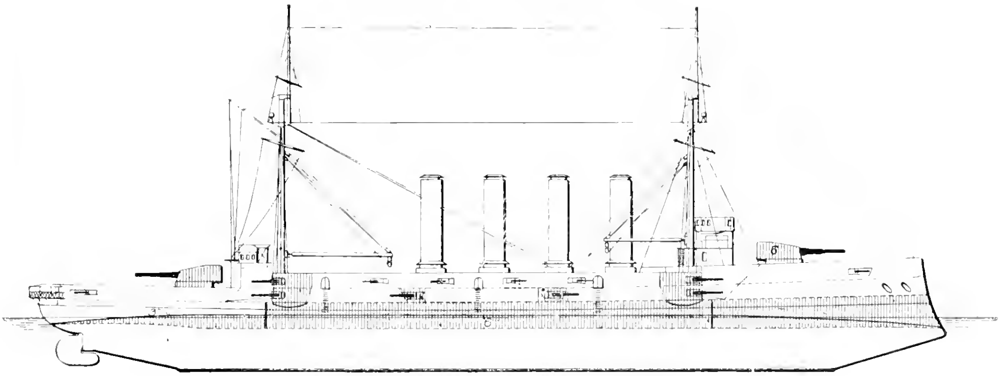


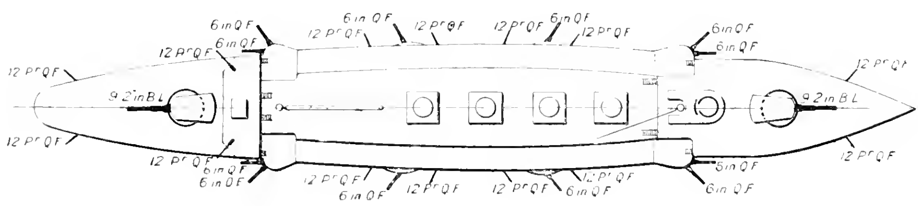
GREAT BRITAIN.

First Class Armoured Cruisers of the

"CRESSY" CLASS

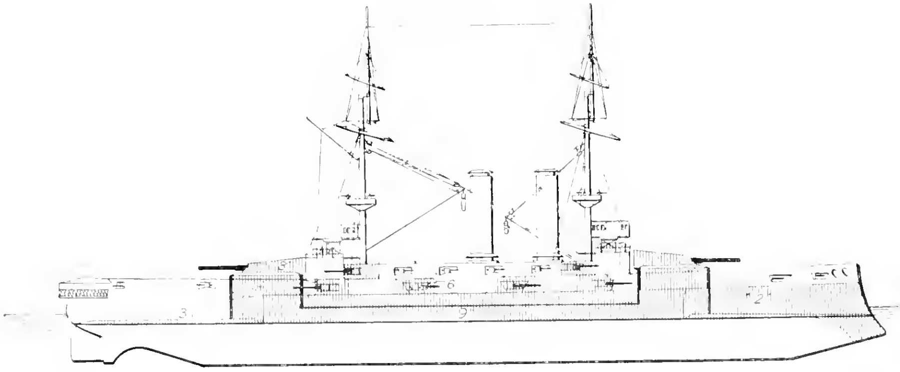
"Cressy", "Aboukir", "Hogue",
"Euryalus", "Sutlej", "Bacchante"

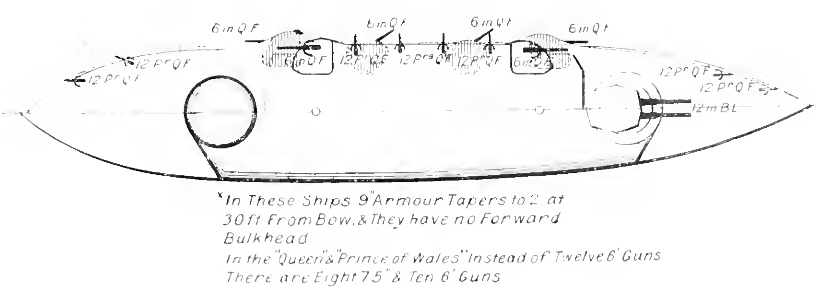




"FORMIDABLE" CLASS

"Formidable", "Irresistible", "Implacable"
x"Bulwark", x"London", x"Venerable"
x"Queen" x"Prince of Wales"

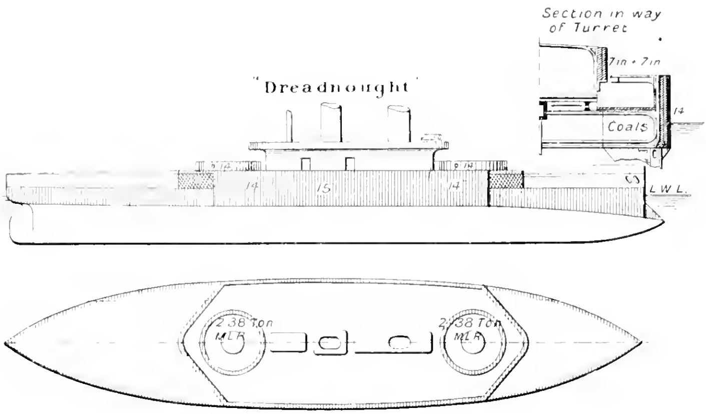




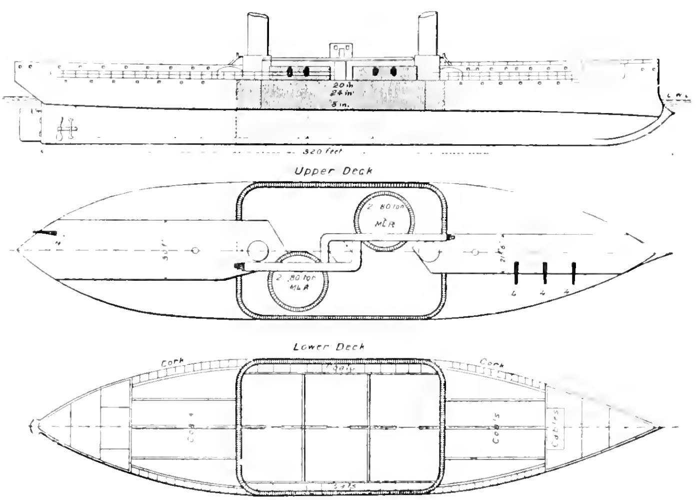
x In These Ships 9" Armour Tapers to 2" at 30 ft From Bow, & They have no Forward Bulkhead
In the "Queen" & "Prince of Wales" Instead of Twelve 6" Guns There are Eight 7.5" & Ten 6" Guns

GREAT BRITAIN.

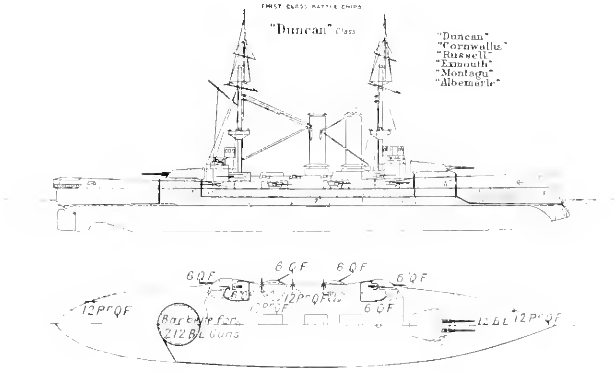
"Dreadnought"



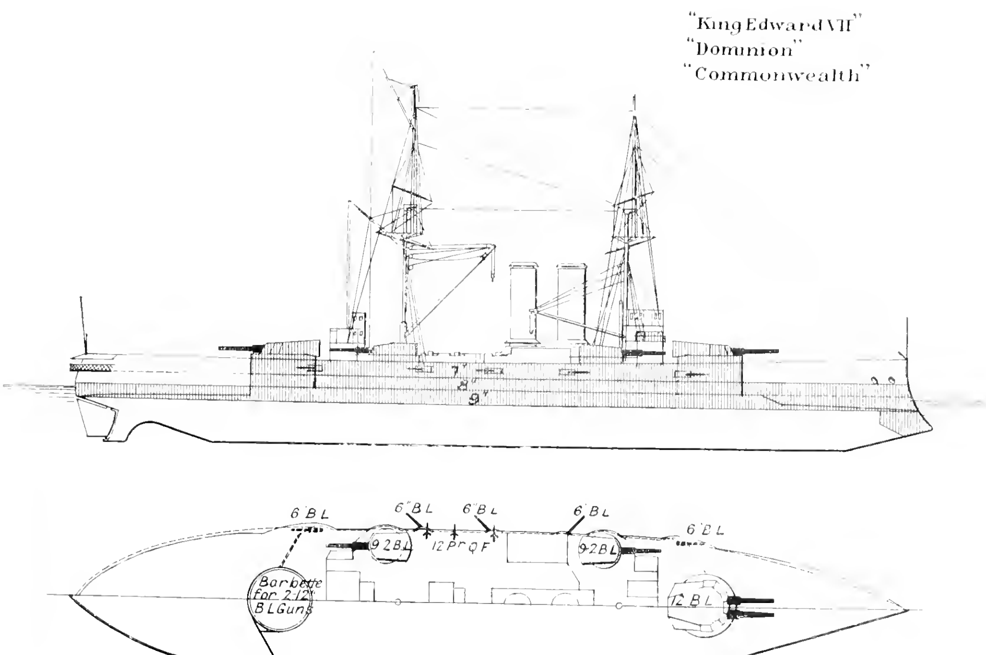
"Inflexible"



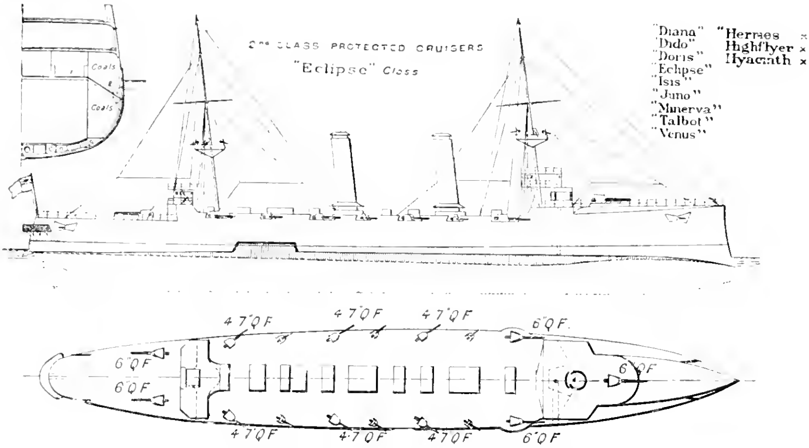
GREAT BRITAIN.



KING EDWARD VII CLASS

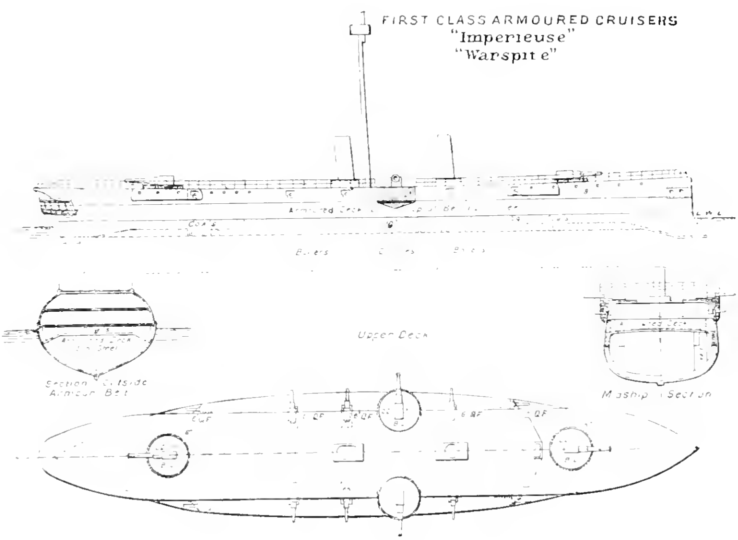


GREAT BRITAIN.

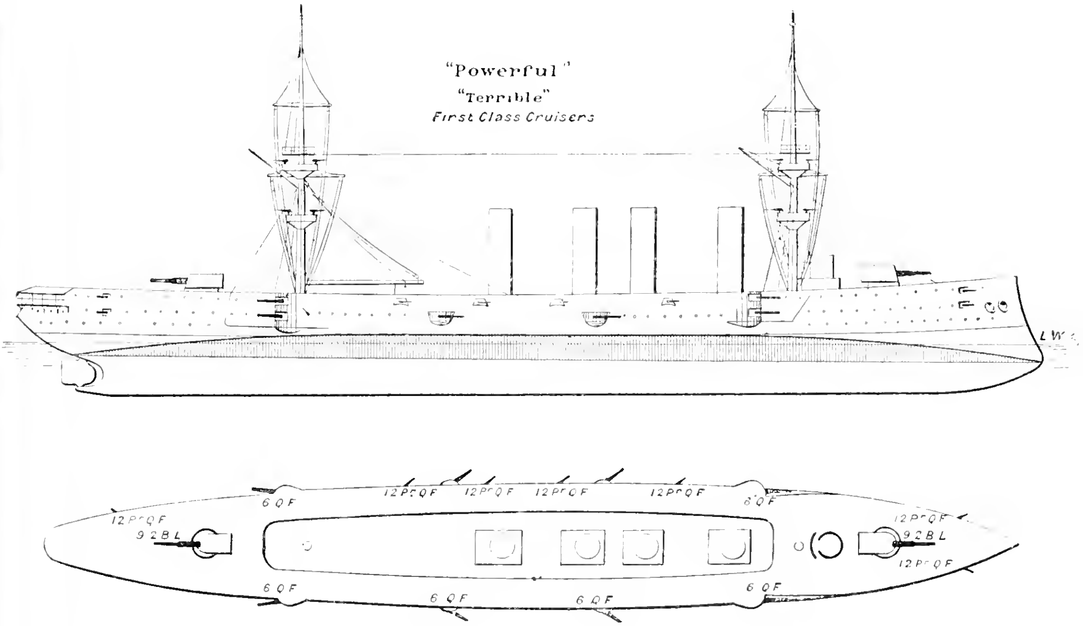


×These Ships Have Eleven 6 inch Q F instead of Five 6 in & Six 4·7 in Q F & Have Three Funnels

N B All The 4·7" Guns in These Ships are to be Replaced with 6" Guns



GREAT BRITAIN.



N B Four 6 in Guns in Casemates will be added

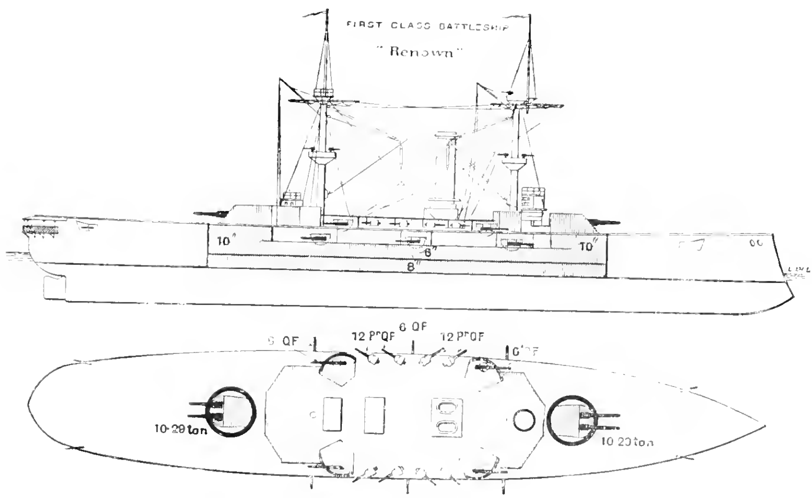
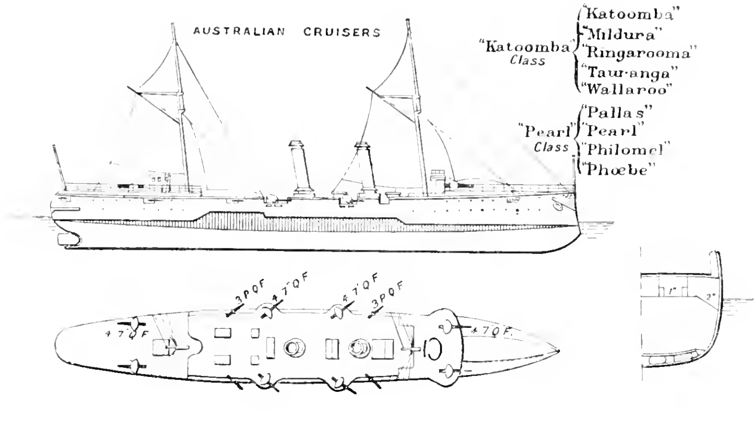


Plate 11.

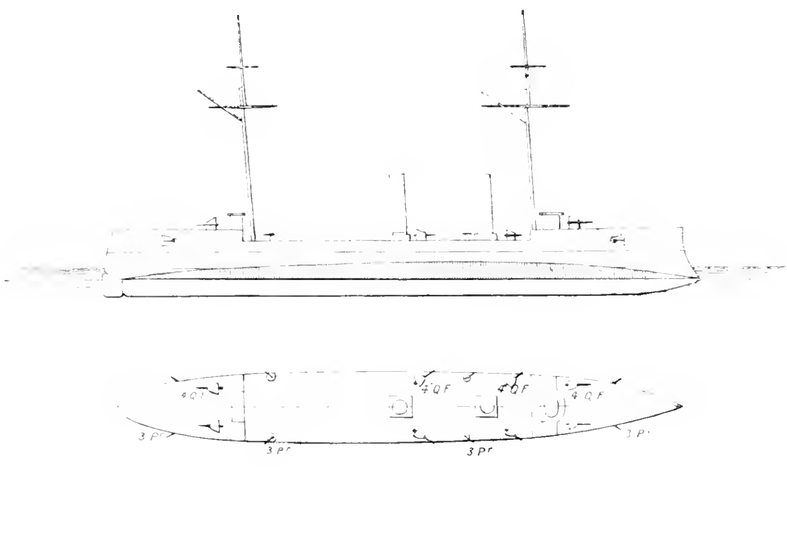
GREAT BRITAIN.



Pelorus Class

Pelorus	*Pomone*
Pactolus	*Prometheus*
Pegasus	*Proserpine*
Perseus	*Pyramus.*
Pandora	*Psyche*

Pioneer

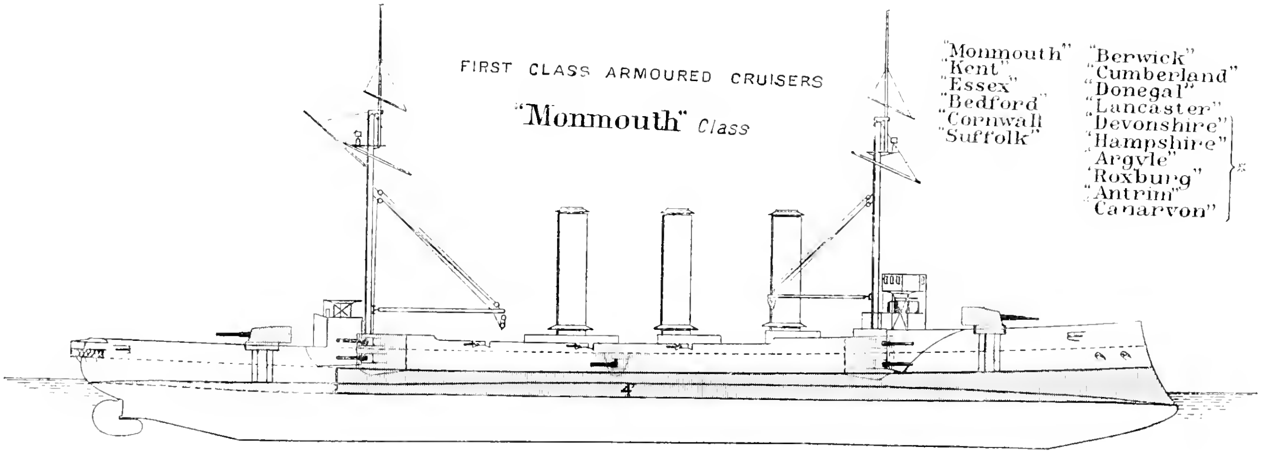


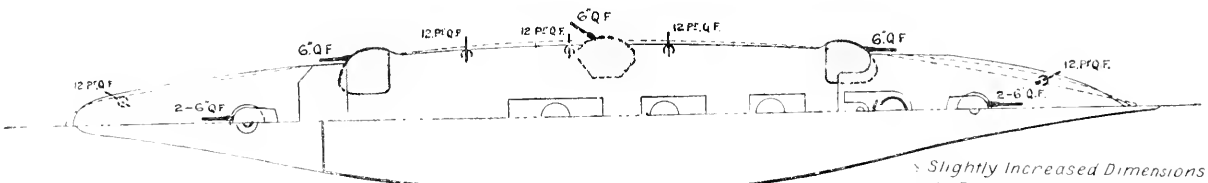
GREAT BRITAIN.

FIRST CLASS ARMOURED CRUISERS

"Monmouth" Class

"Monmouth"	"Berwick"
"Kent"	"Cumberland"
"Essex"	"Donegal"
"Bedford"	"Lancaster"
"Cornwall"	"Devonshire" *
"Suffolk"	"Hampshire" *
	"Argyle" *
	"Roxburg" *
	"Antrim" *
	"Canarvon" *





* Slightly Increased Dimensions the Formost and Aftermost Pair of 6 in Guns are each Replaced by a Single 7.5 in Gun

GREAT BRITIAN.

"Majestic"

"Majestic" Class

"Majestic" "Victorious"
"Magnificent" "Mars"
"Hannibal" "Illustrious"
"Prince George" "Cœsar"
"Jupiter"

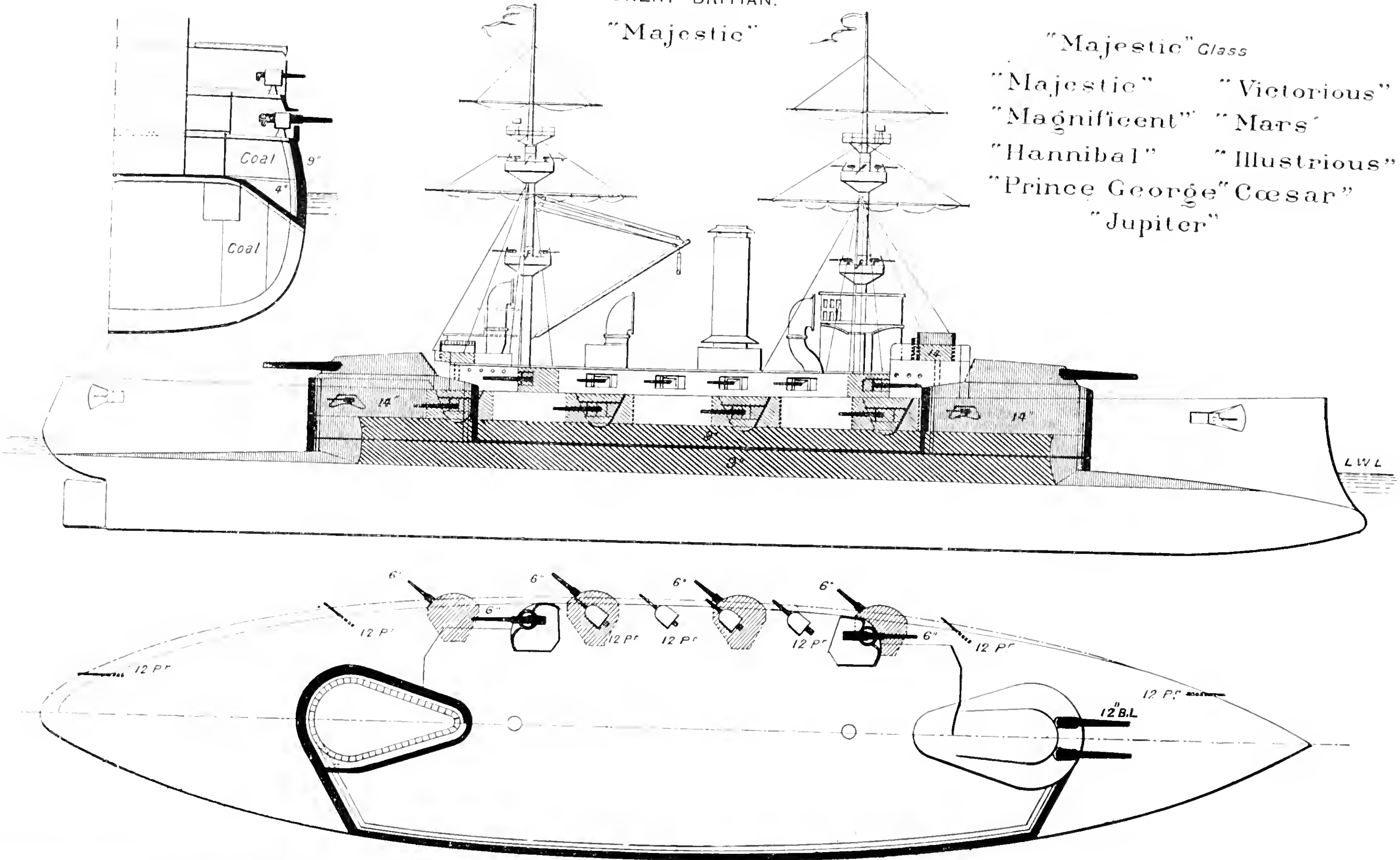
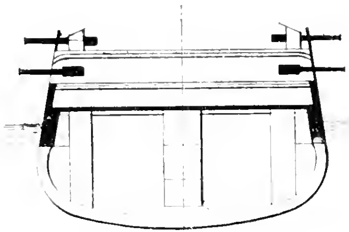


PLATE 14.

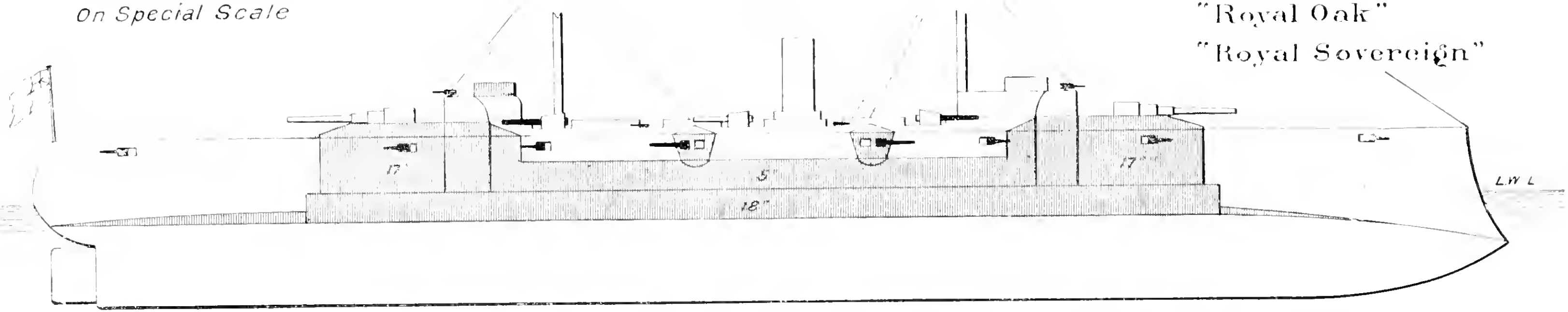
"Royal Sovereign" Class

14.150 tons 13.000, I H. P

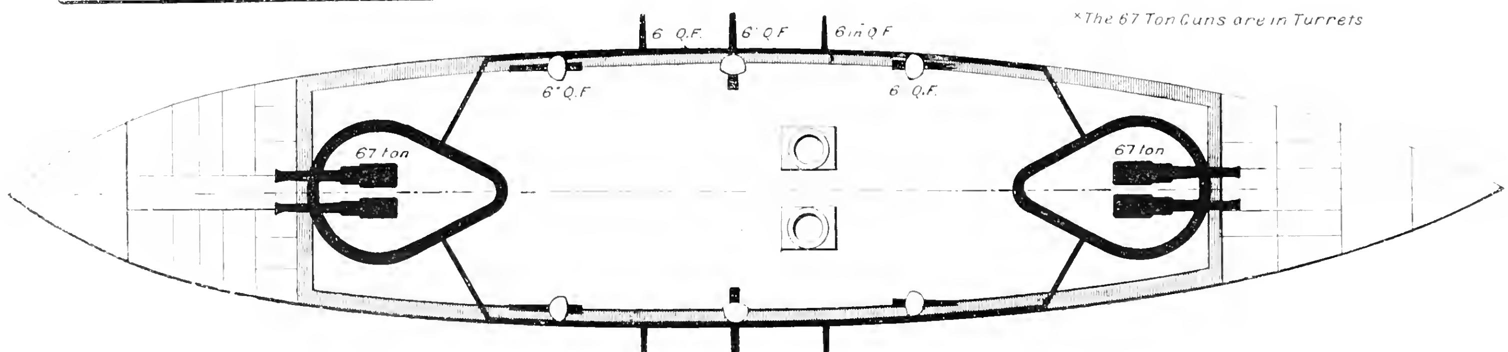
×"Hood"
"Empress of India"
"Ramillies"
"Repulse"
"Resolution"
"Revenge"
"Royal Oak"
"Royal Sovereign"



On Special Scale



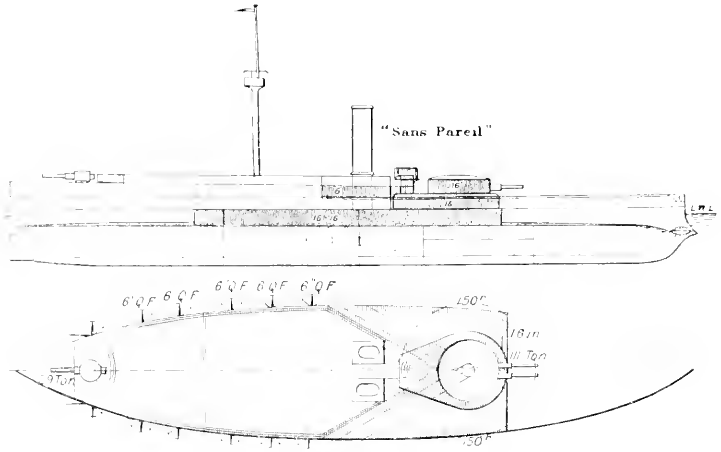
× The 67 Ton Guns are in Turrets

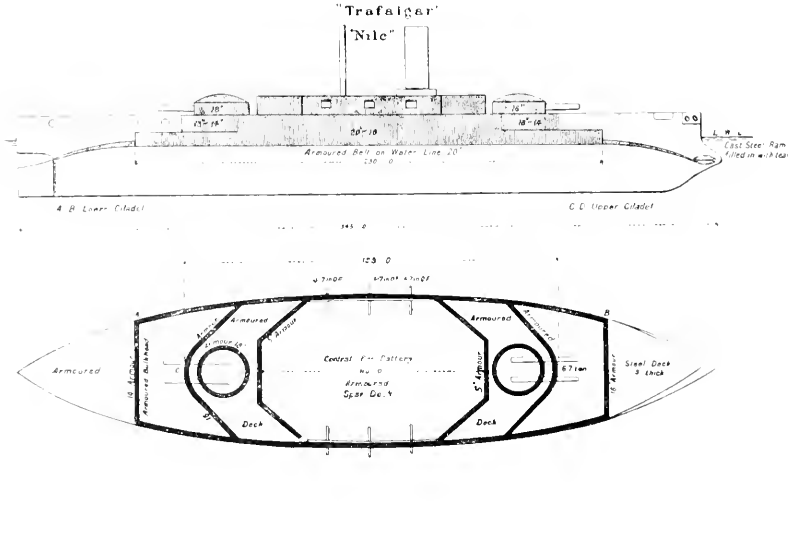


N.B. The 6 in Guns on Upper Deck
Will all be put into Casemates

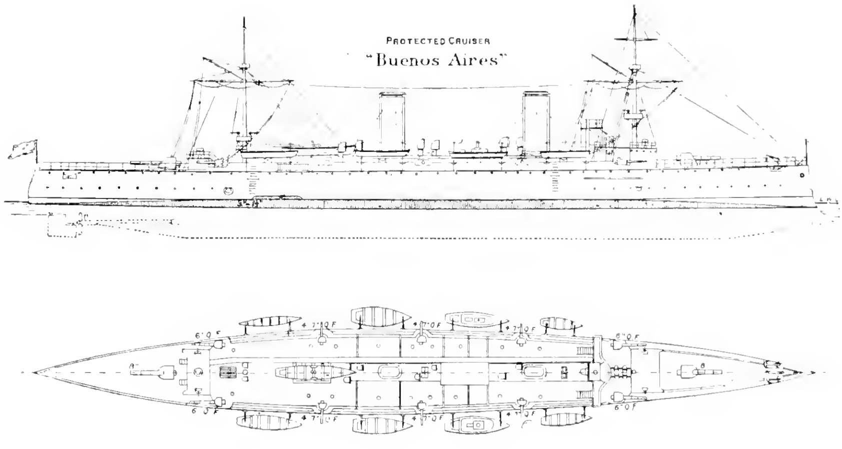
PLAT

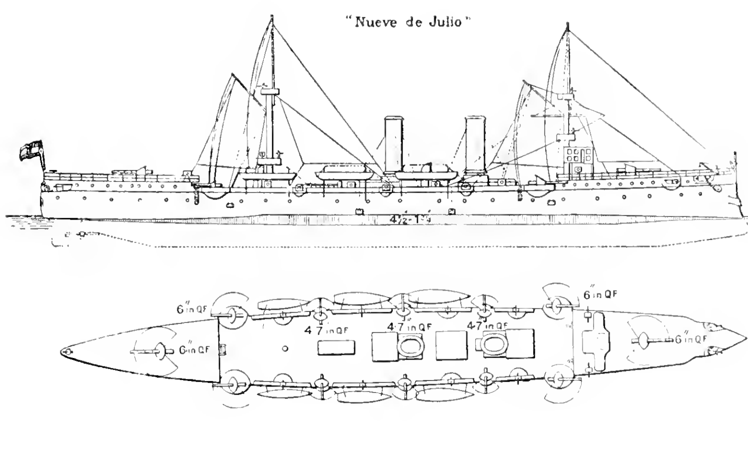
GREAT BRITAIN.



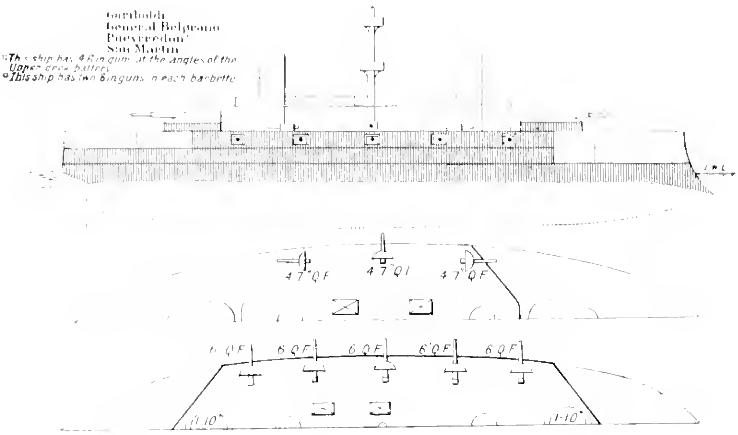


ARGENTINA.

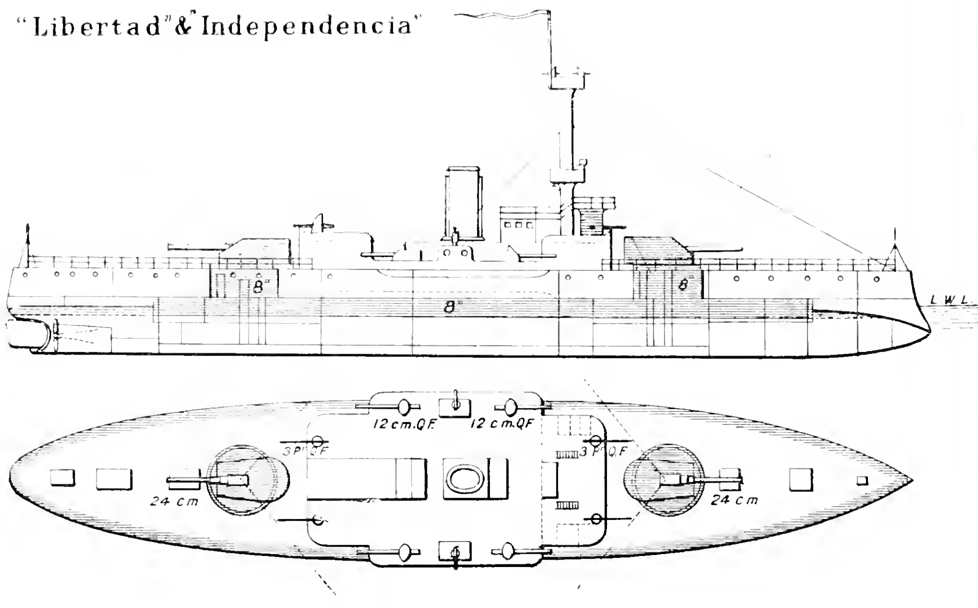

PROTECTED CRUISER
"Buenos Aires"
6" Q F
4·7" Q F


"Nueve de Julio"
4½-1¾
L W L
6" in QF
4·7 in QF

ARGENTINA.

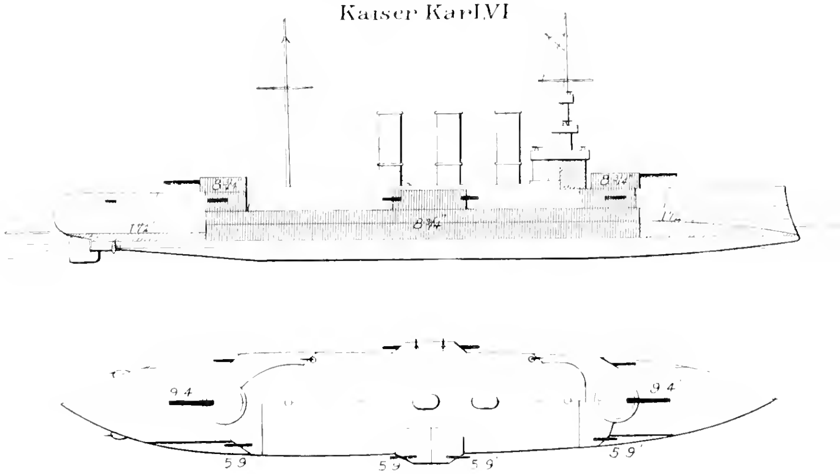


"Libertad" & "Independencia"

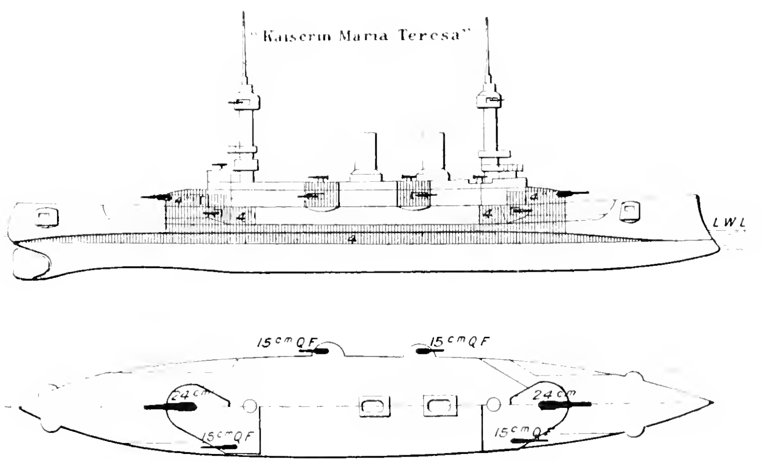


AUSTRIA.

ARMOURED CRUISER
Kaiser Karl VI

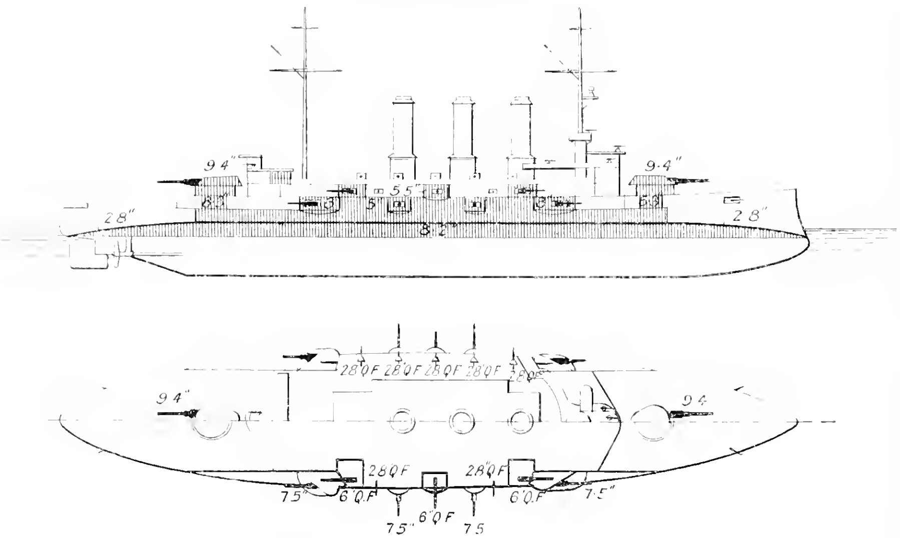


"Kaiserin Maria Teresa"

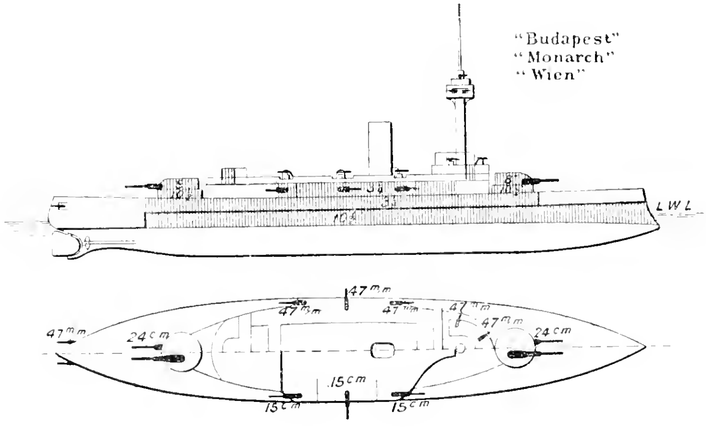


AUSTRIA.

"A" (Ersatz Laudon)
"B" (Ersatz Drache)

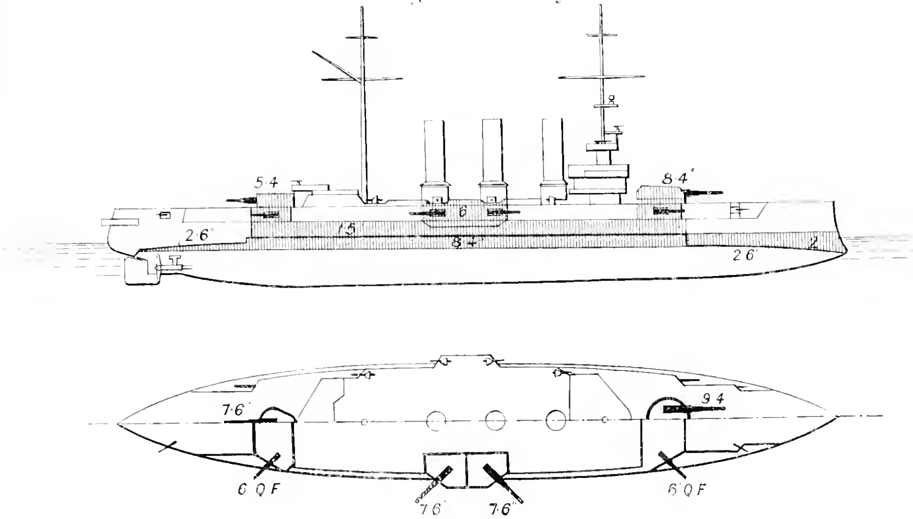


"Budapest"
"Monarch"
"Wien"

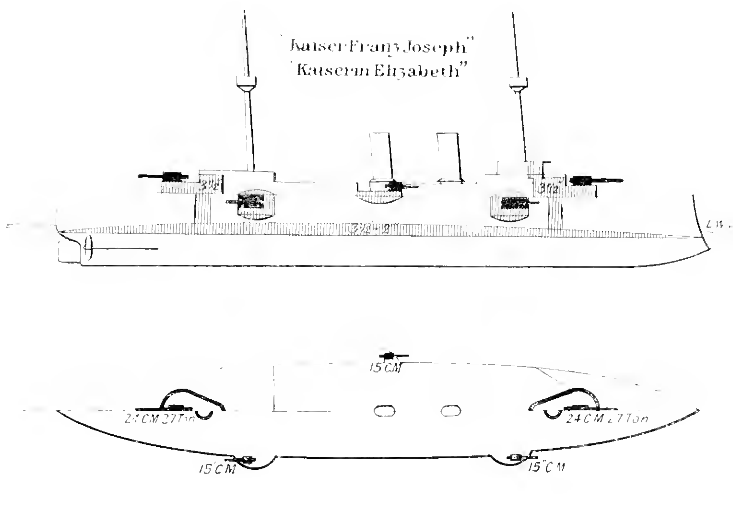


AUSTRIA.

"E" (Ersatz Radetzky)

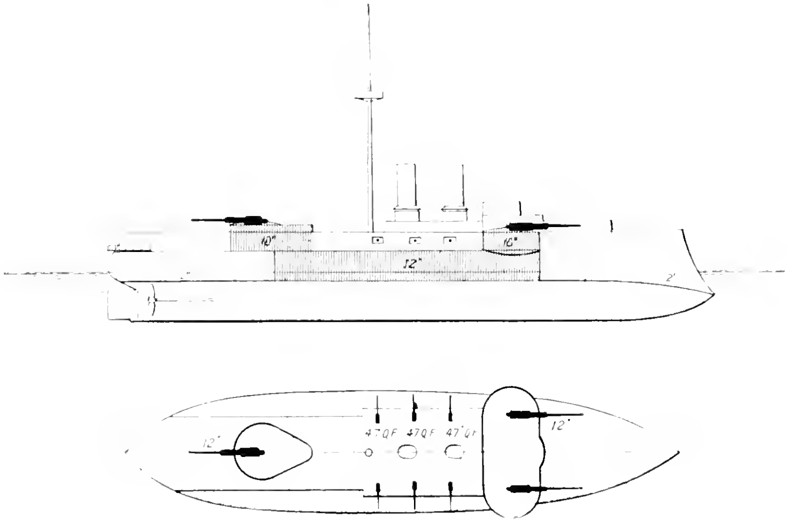


"Kaiser Franz Joseph"
"Kaiserin Elizabeth"

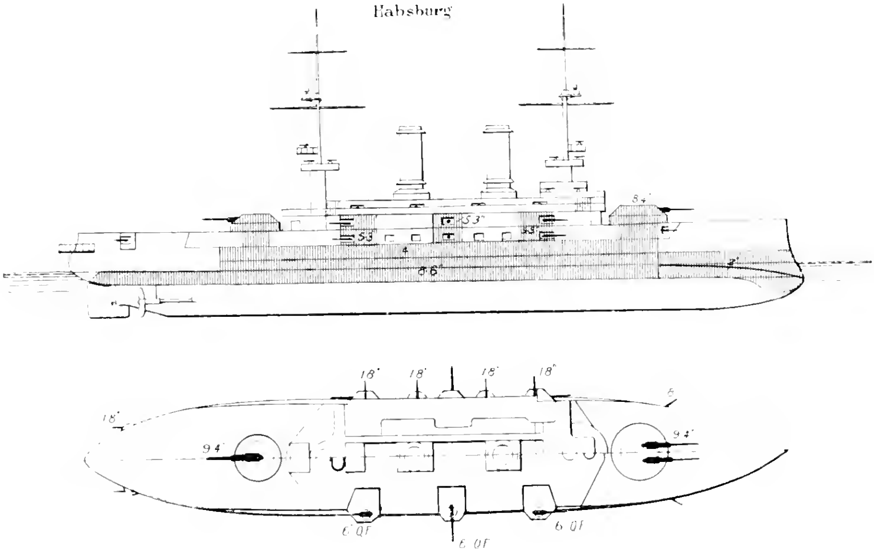


AUSTRIA

Kronprinz Erzherzog Rudolph

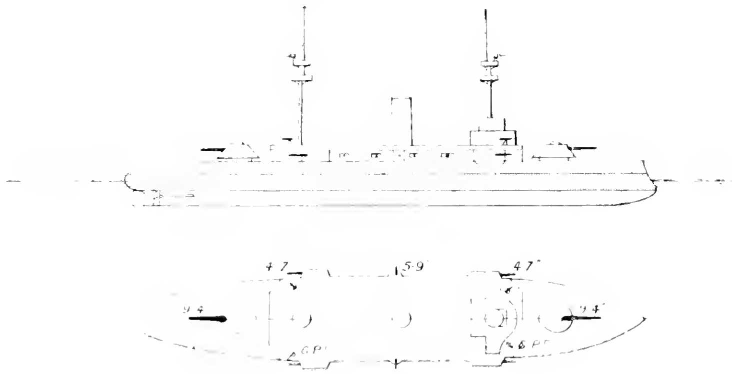


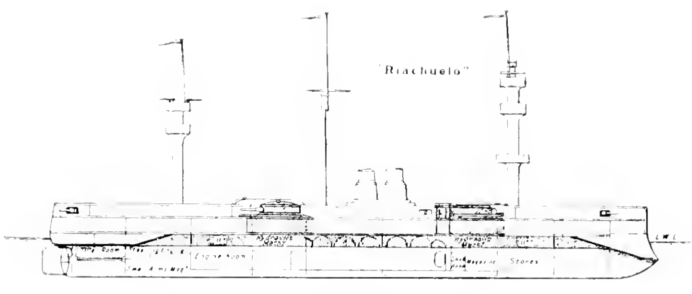
Habsburg



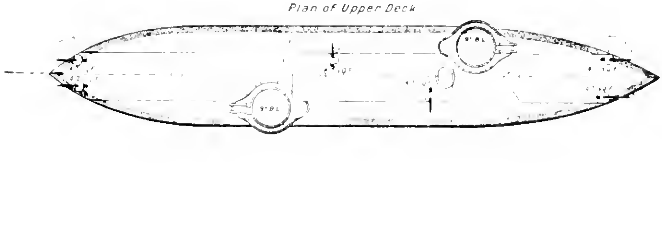
BRAZIL.

Marshal Deodoro
Marshal Floriano.



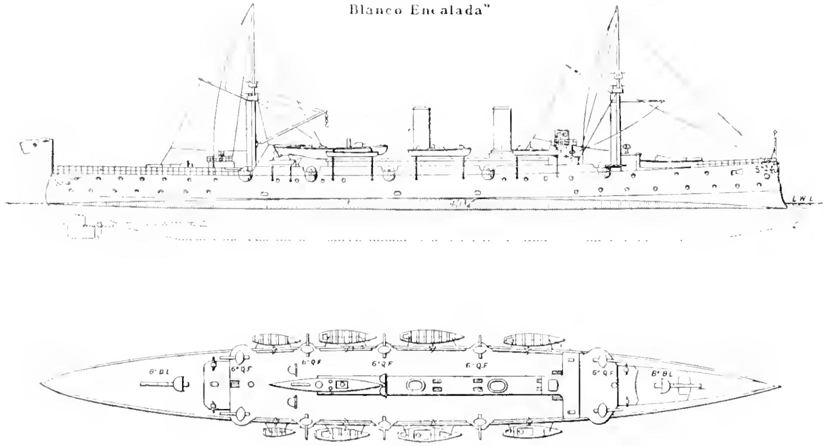


Plan of Upper Deck.



CHILI.

"Blanco Encalada"



"Capitan Prat"

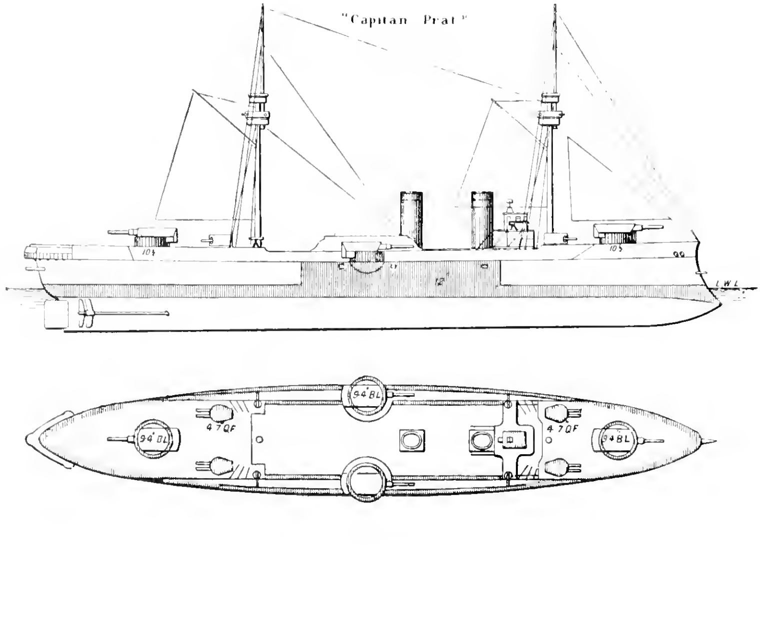


PLATE 24.

CHILI.

Armoured Cruiser
"Esmeralda"

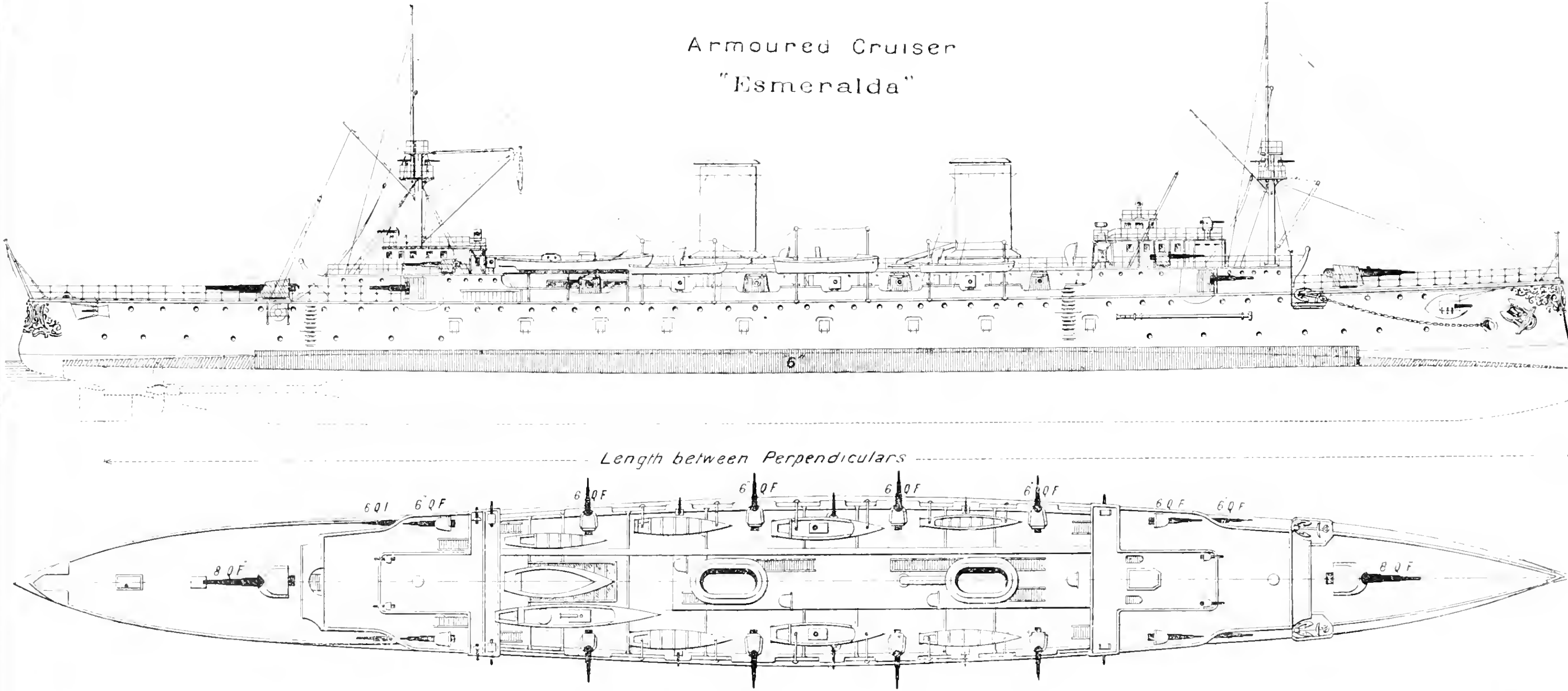
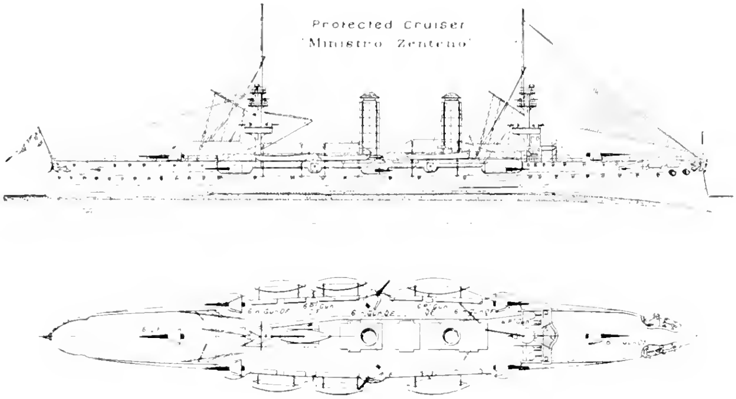


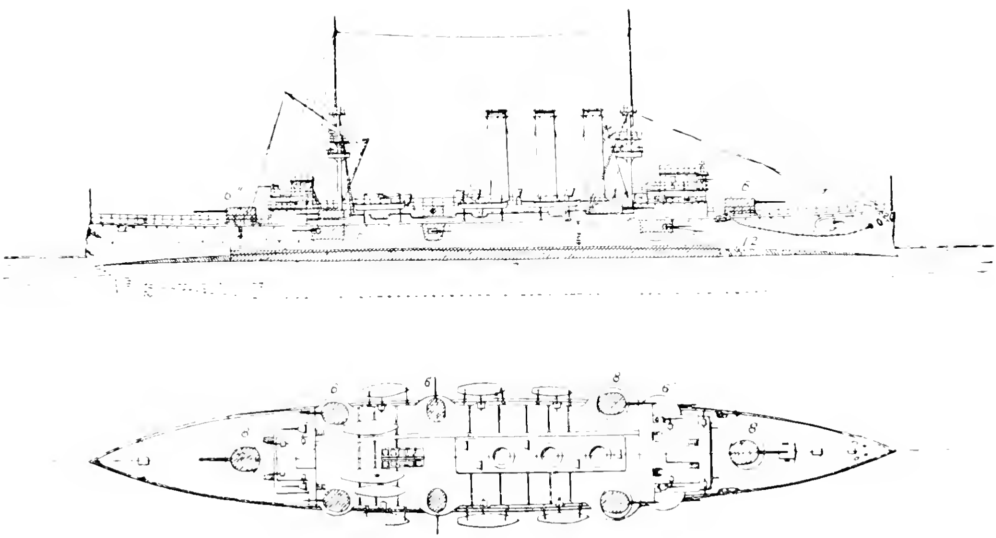
Plate 25.

CHILI.

Protected Cruiser
'Ministro Zenteno'

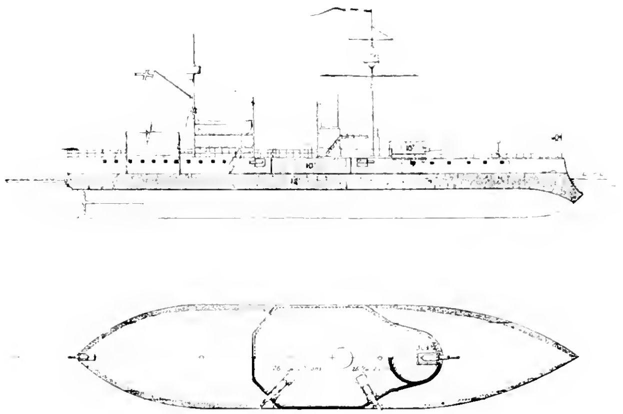


O Higgins

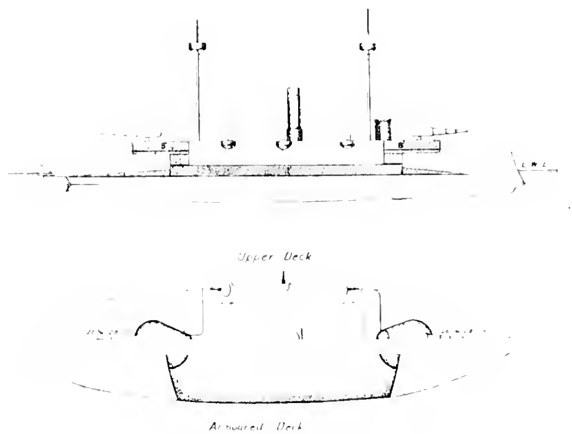


DENMARK.

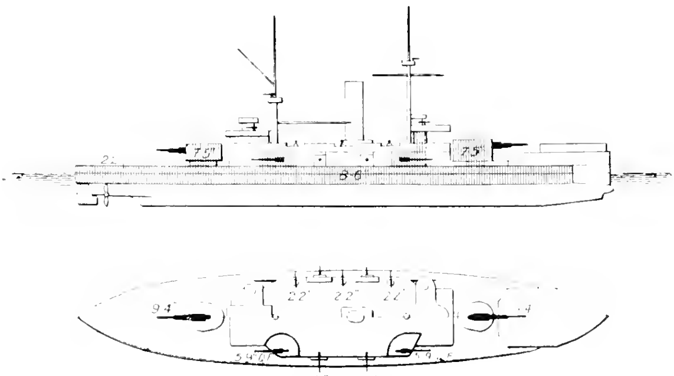
Helgoland



Iver Hvitfeldt

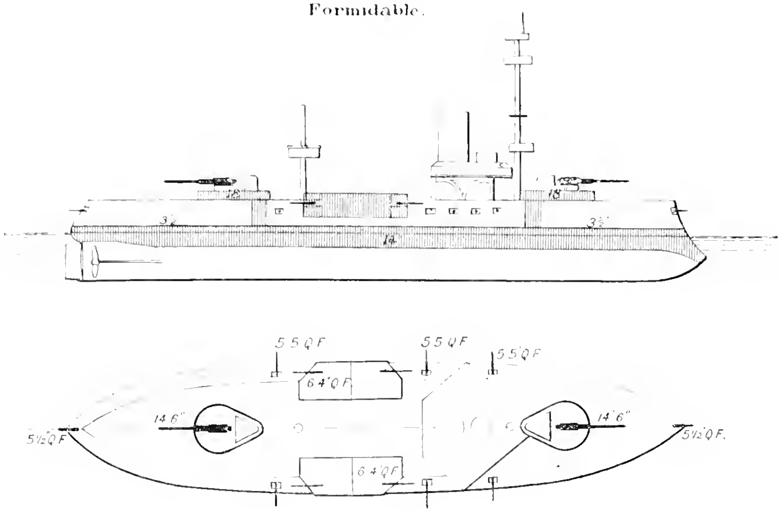


Herluf Trolle

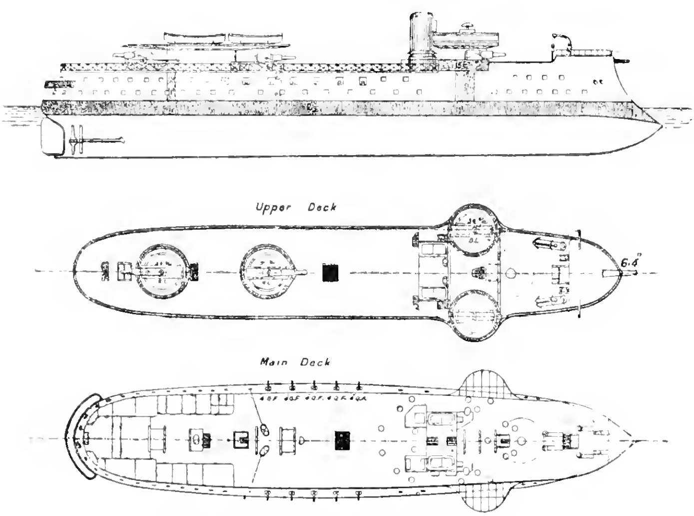


FRANCE.

Amiral Baudin.
Formidable.

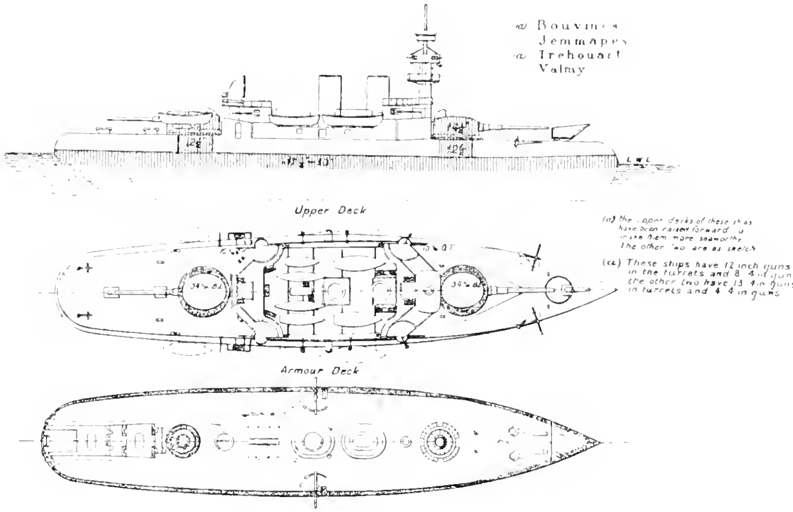


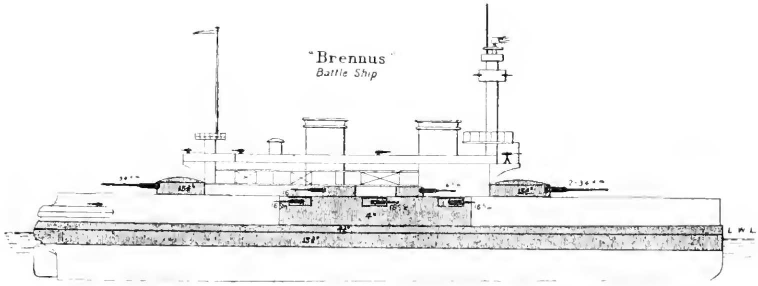
"Amiral Duperré"



N B The Central Barbette for 13.3 in to be
Replaced by Two Redoubts for Four 6.4 in Guns

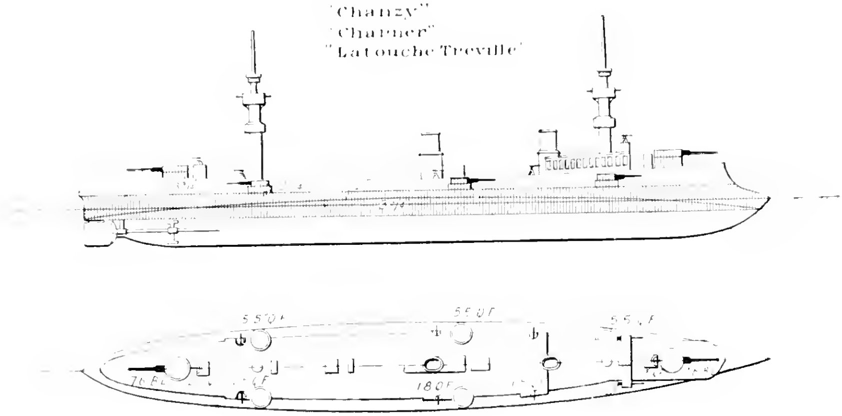
FRANCE.


(a) Bouvines
Jemmapes
(a) Trehouart
Valmy
Upper Deck
Armour Deck
L W L
(a) the upper decks of these ships have been raised forward to make them more seaworthy. The other two are as sketch
(a) These ships have 12 inch guns in the turrets and 8 4 in guns the other two have 13 4 in guns in turrets and 4 4 in guns

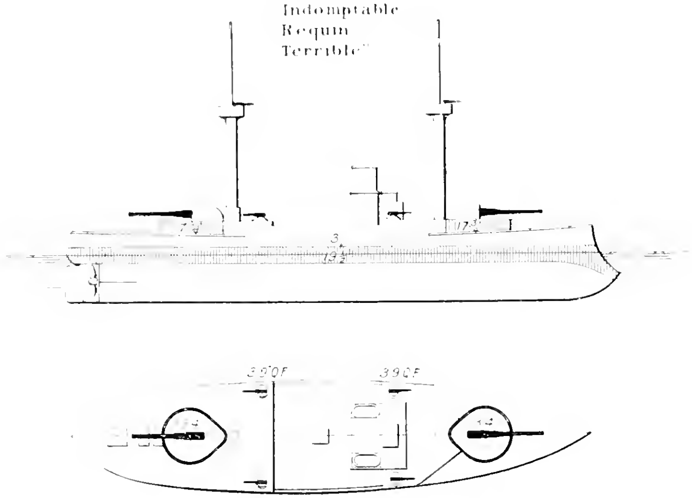

"Brennus"
Battle Ship
L W L

FRANCE.

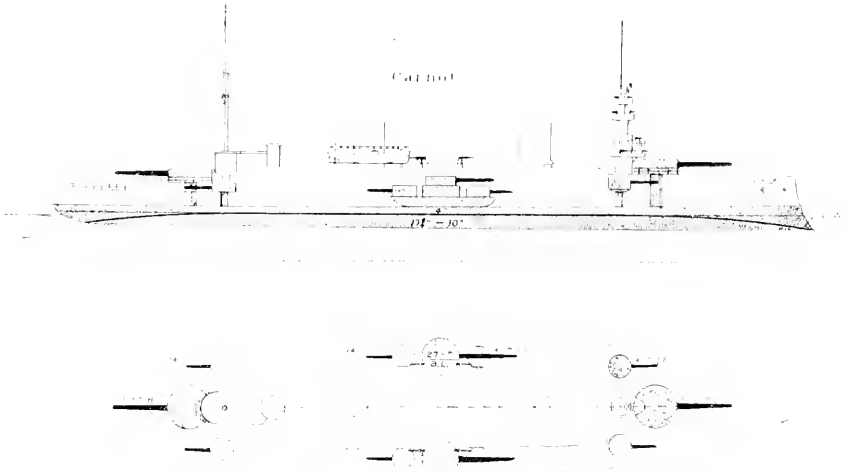
"Bruix"
"Chanzy"
"Charner"
"Latouche Treville"

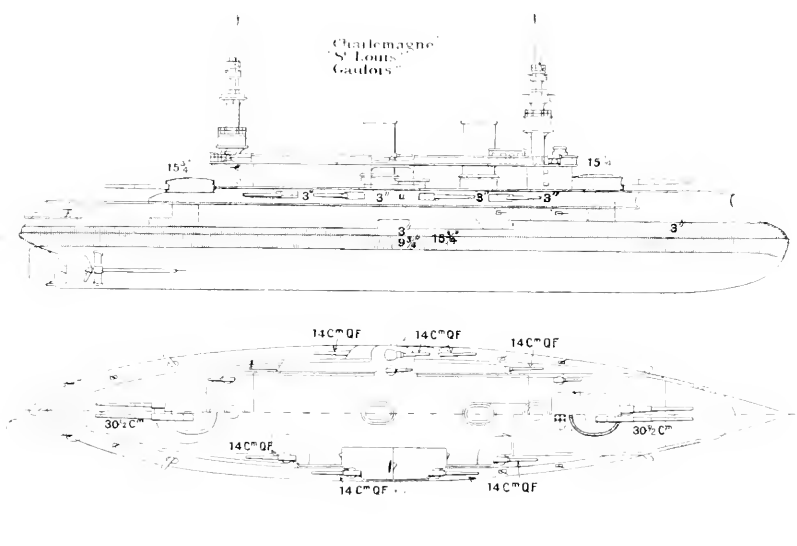


"Caiman"
"Indomptable"
"Requin"
"Terrible"

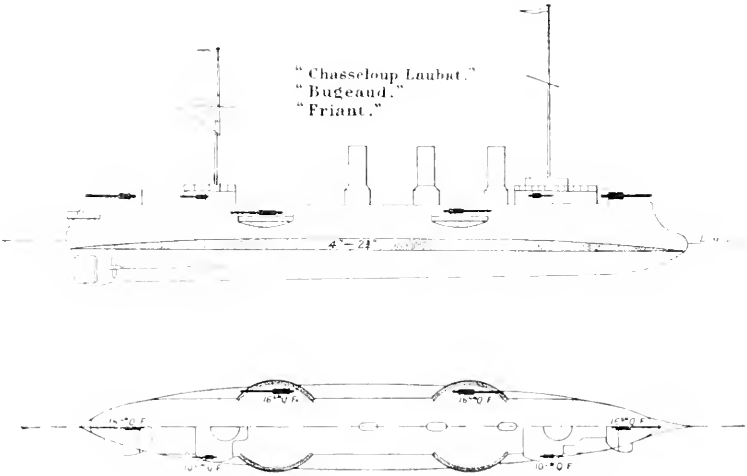


FRANCE.

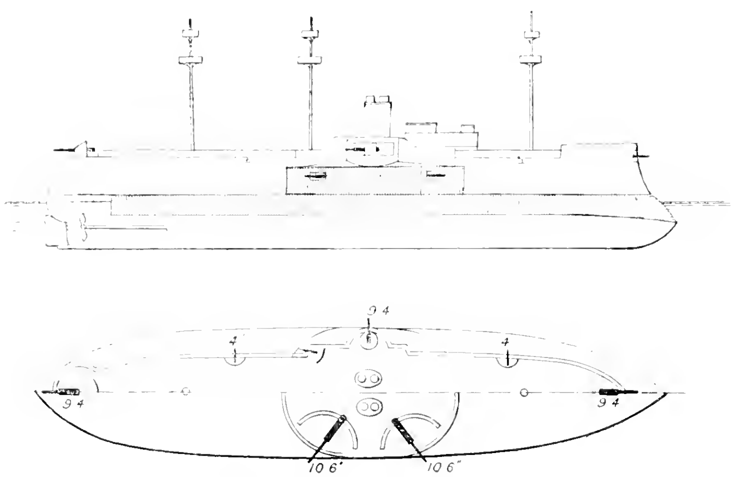




FRANCE.



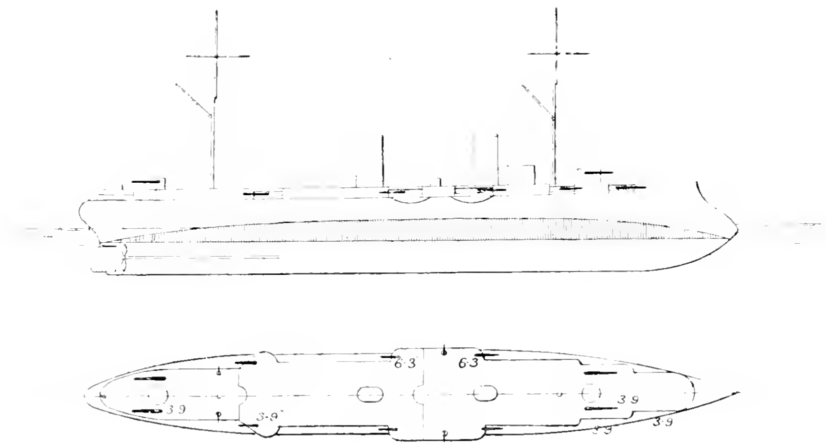
Devastation Courbet Redoutable



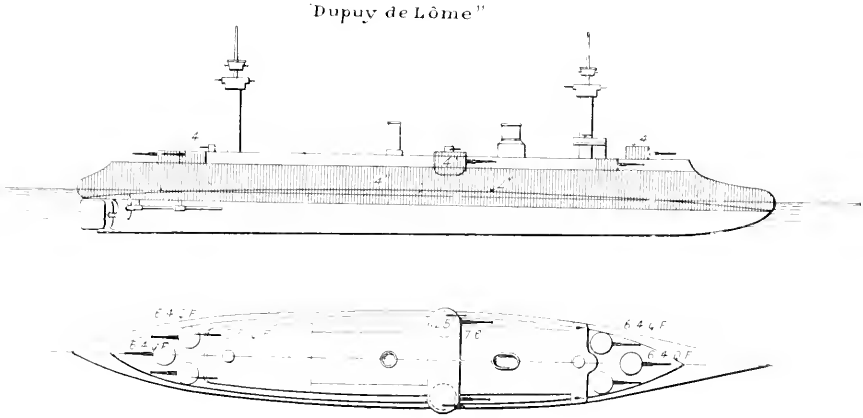
Devastation Has Fourteen 4" Guns
Courbet „ Ten „ „
Redoutable „ Four „ „

FRANCE.

Descartes

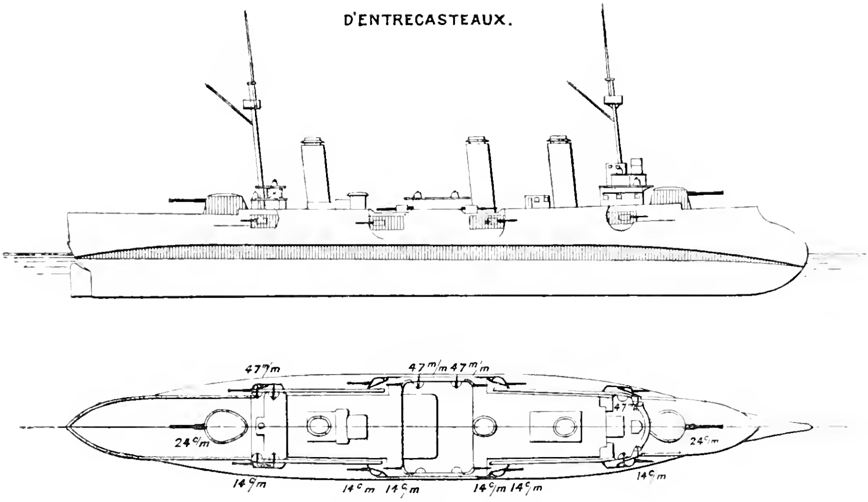


"Dupuy de Lôme"

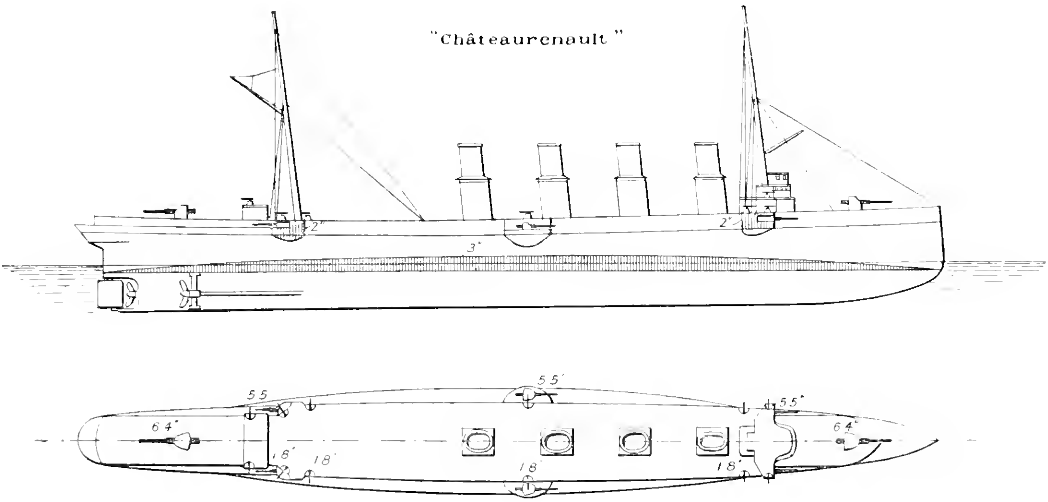


FRANCE.

D'ENTRECASTEAUX.

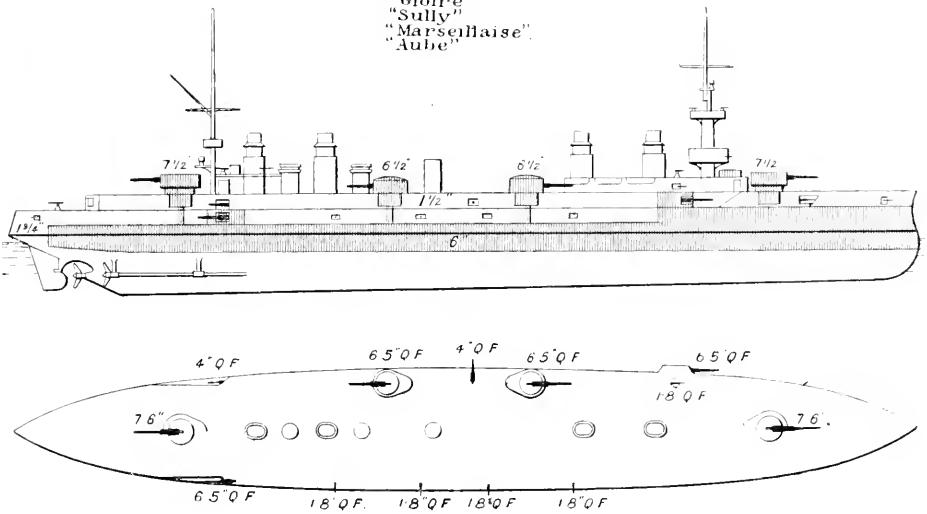


"Châteaurenault"

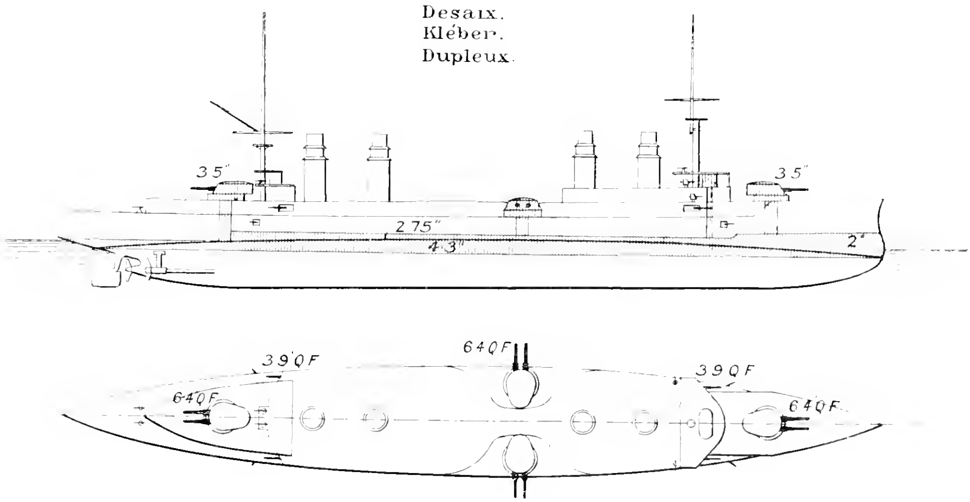


FRANCE.

ARMOURED CRUISERS
"Condé"
"Gloire"
"Sully"
"Marseillaise"
"Aube"

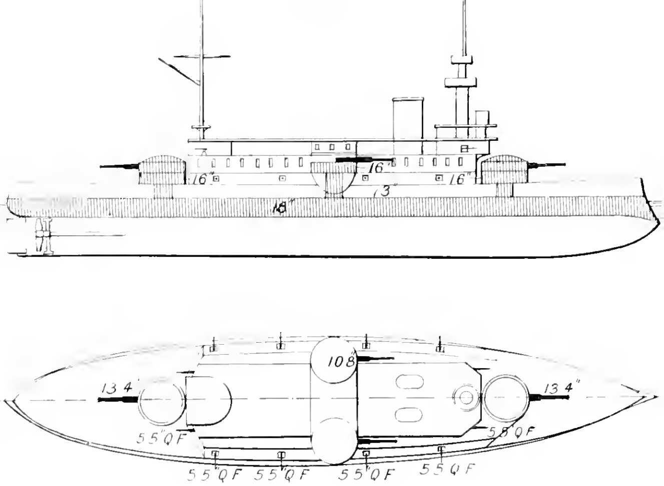


Desaix.
Kléber.
Dupleux.



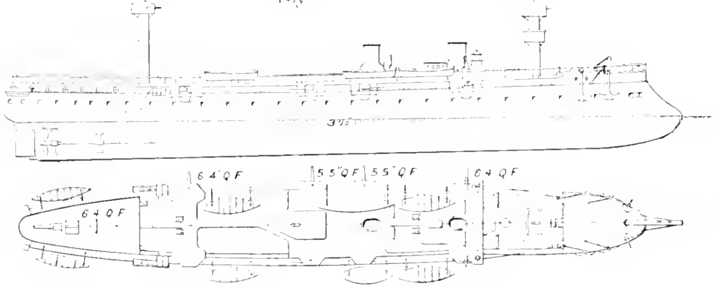
FRANCE.

"Hoche"



PROTECTED CRUISERS

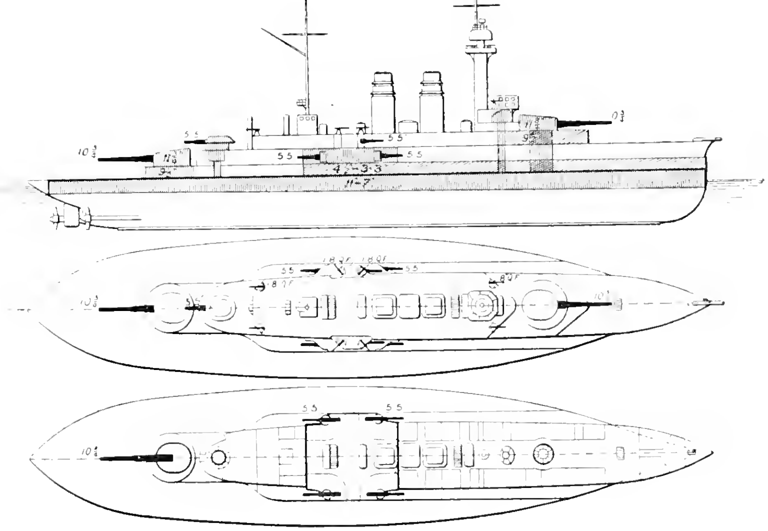
"Jean-Bart"
"Alger"
"Isly"



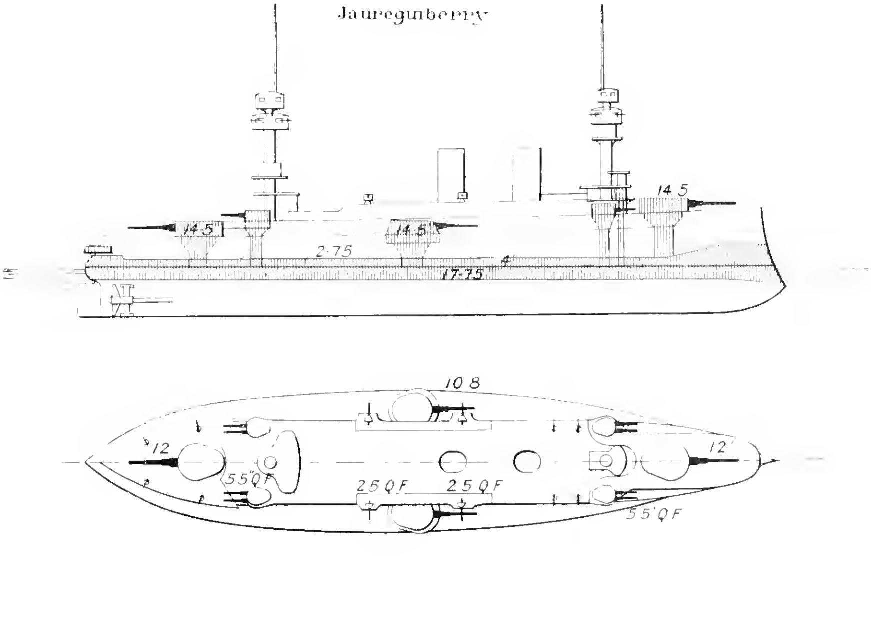
FRANCE.

BATTLE-SHIP SECOND CLASS

Henri IV

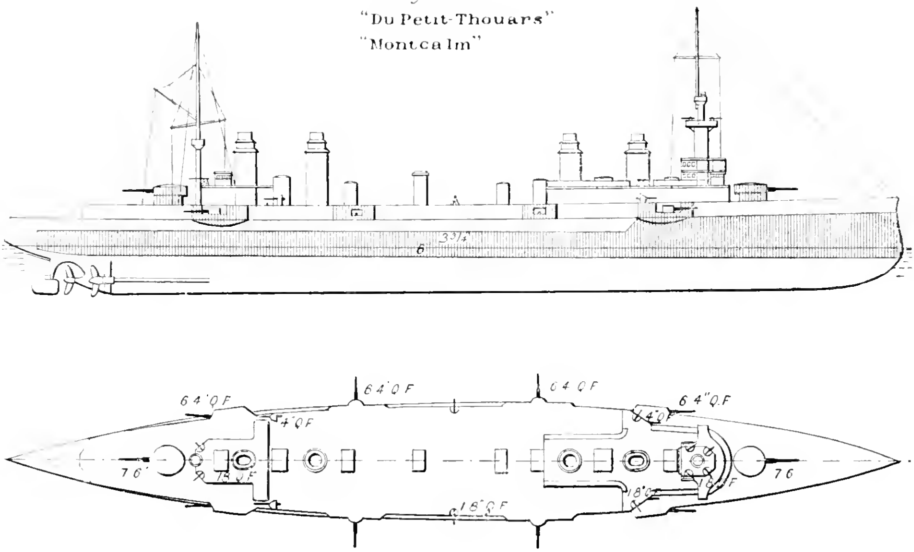


Jaureguiberry

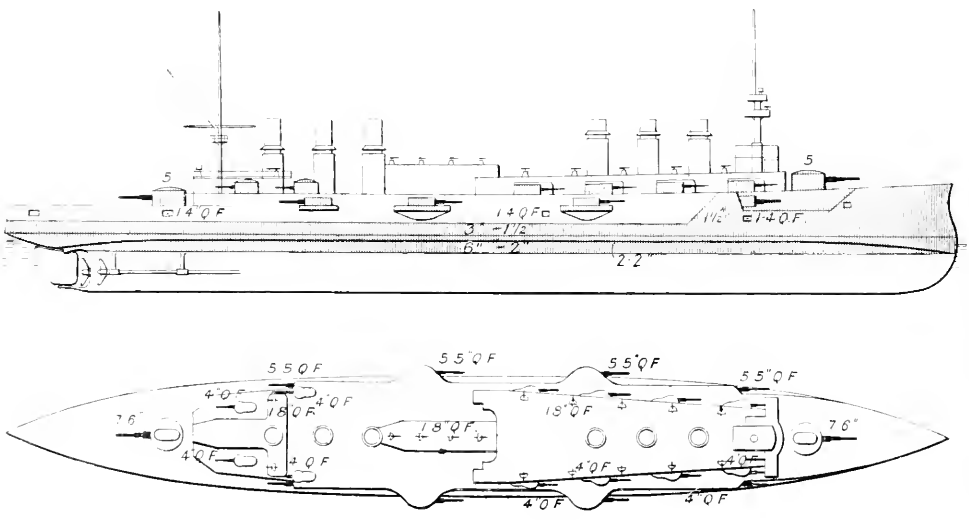


FRANCE.

"Gueydon"
"Du Petit-Thouars"
"Montcalm"

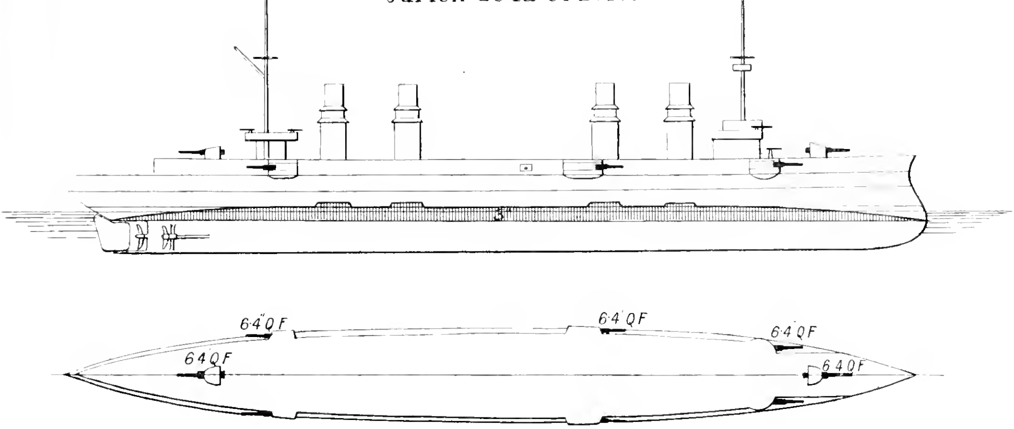


ARMOURED CRUISER.
"Jeanne d'Arc"



FRANCE.

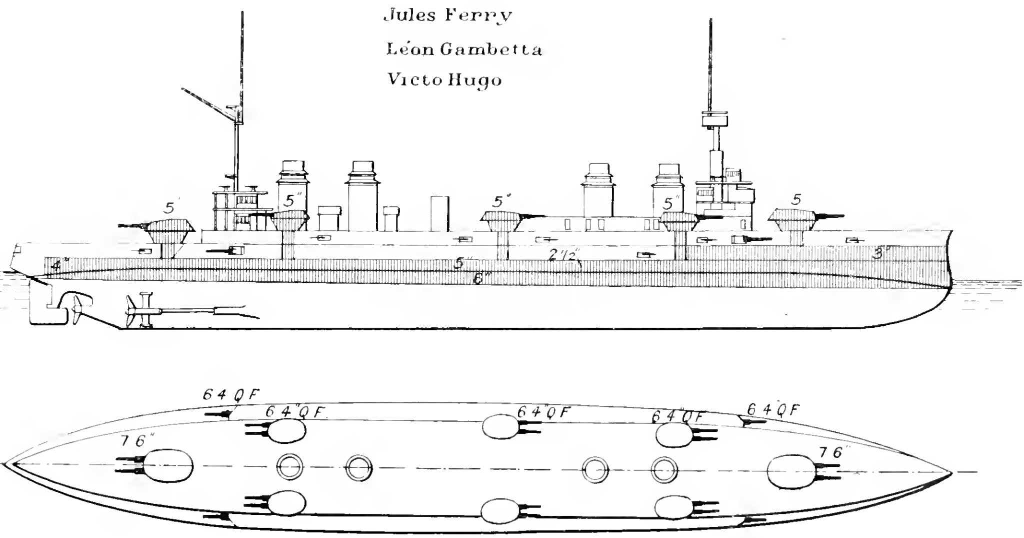
Jurien de la Gravière



Jules Ferry

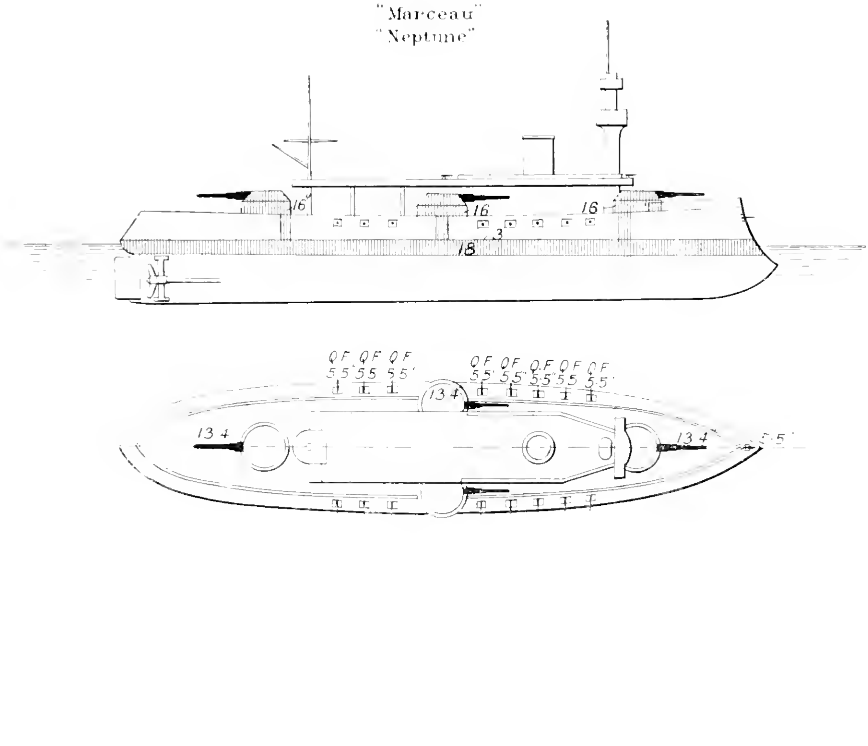
Léon Gambetta

Victo Hugo



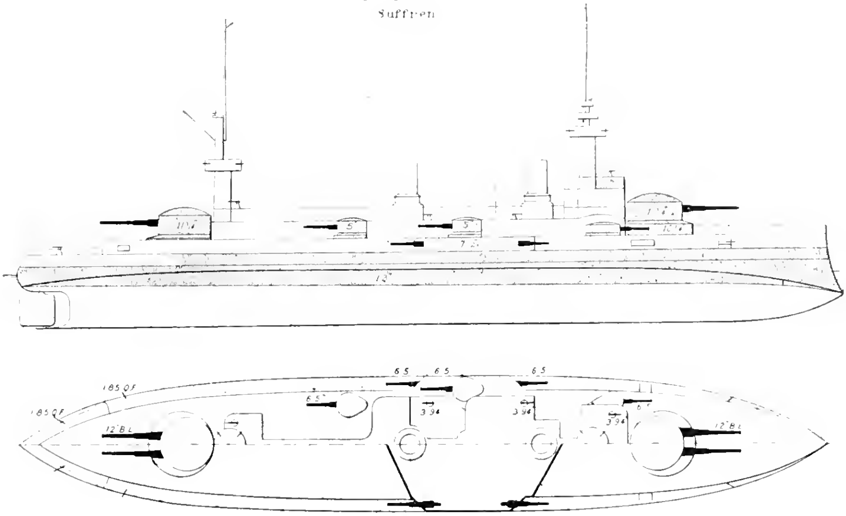
FRANCE.

"Magenta"
"Marceau"
"Neptune"

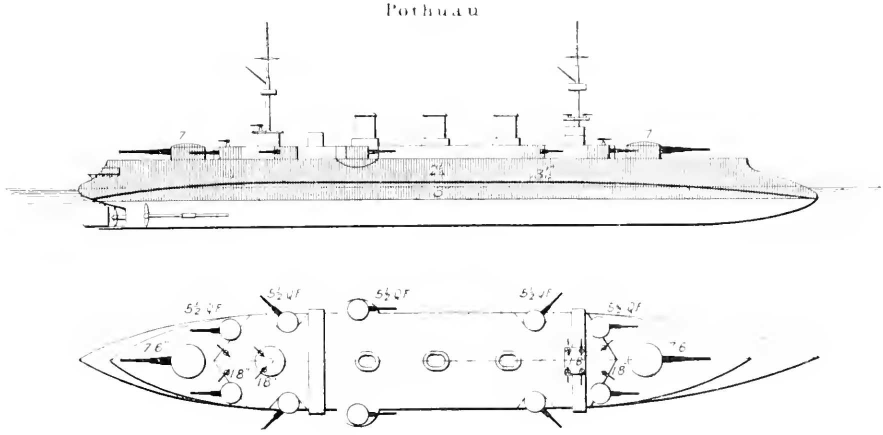


FRANCE

BATTLE SHIP
Suffren

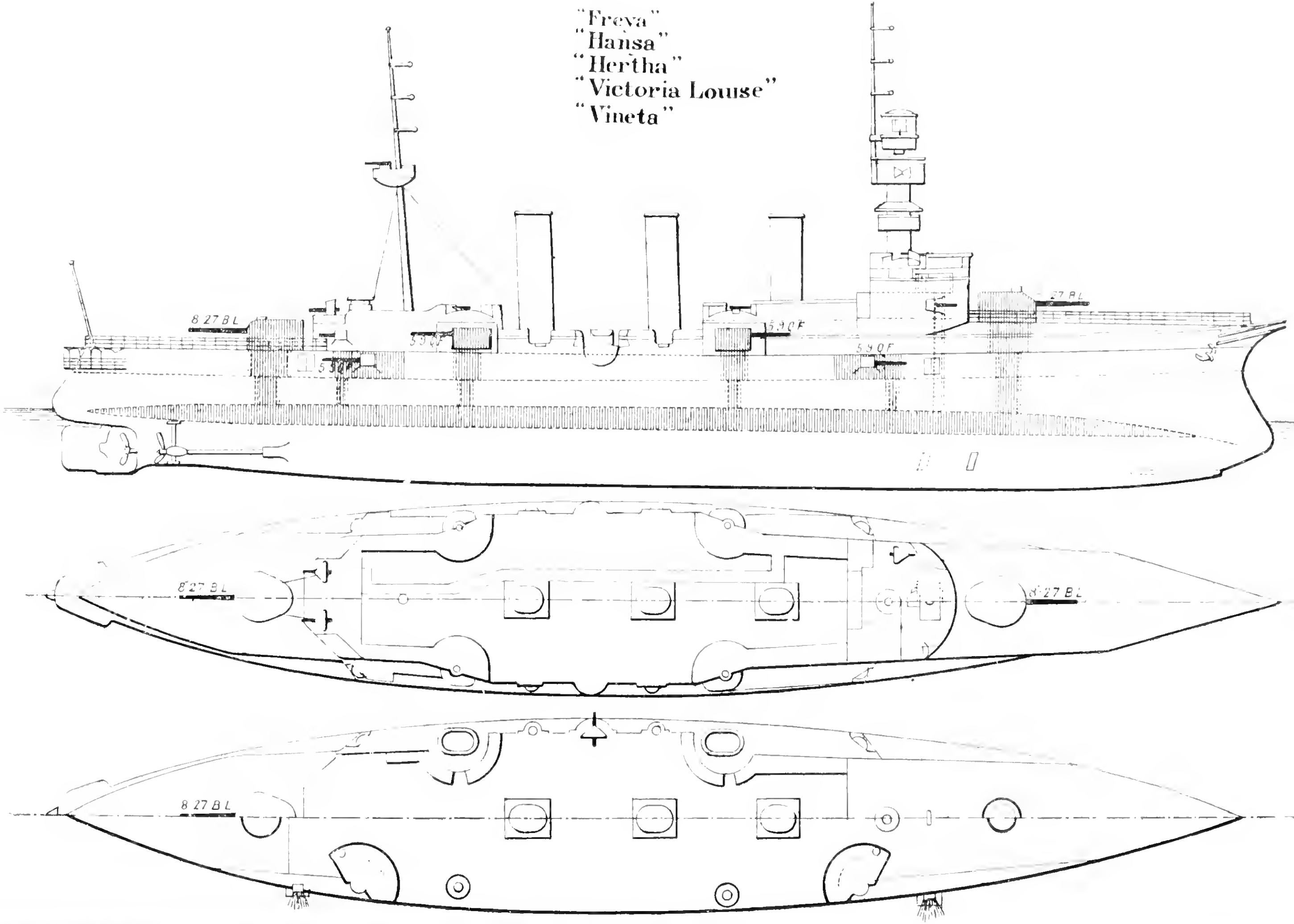


Pothuau



GERMANY.

"Freya"
"Hansa"
"Hertha"
"Victoria Louise"
"Vineta"



GERMANY.

"Fürst Bismarck"

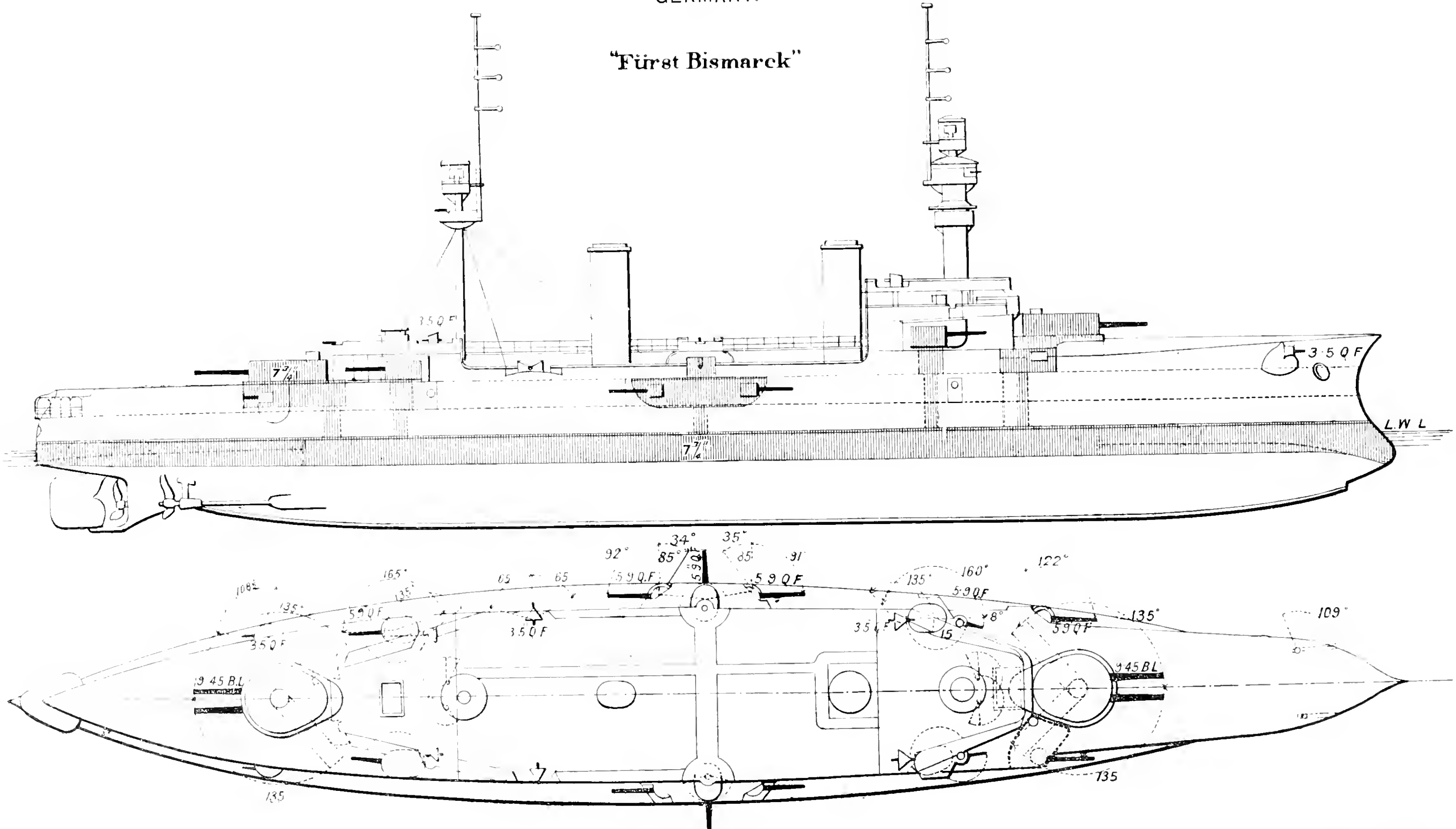
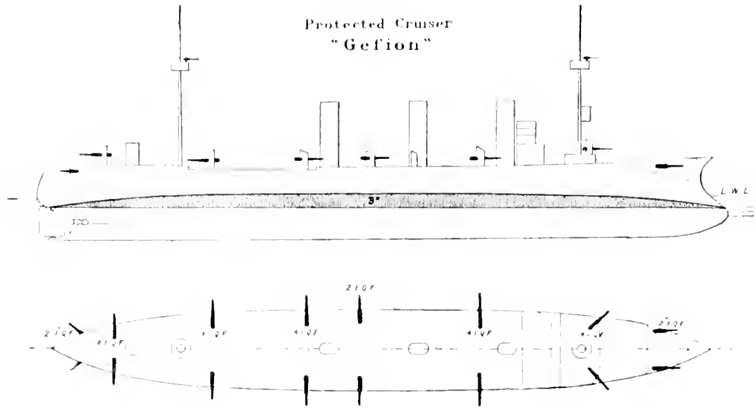
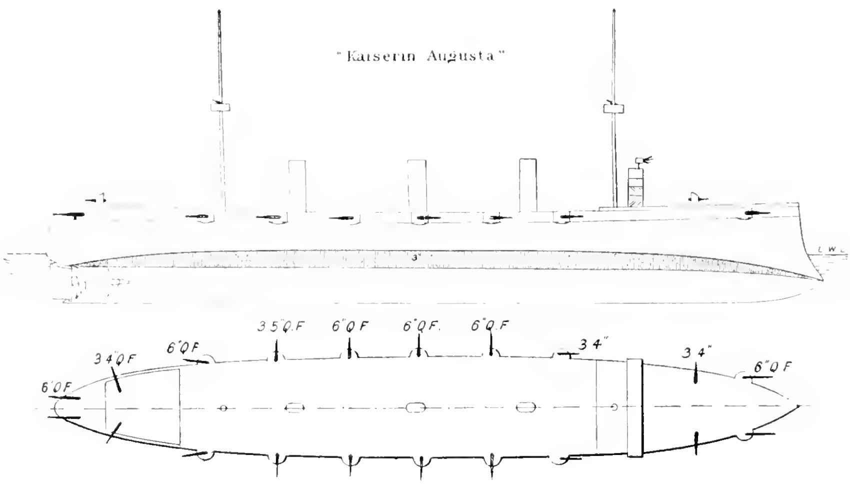


PLATE 13.

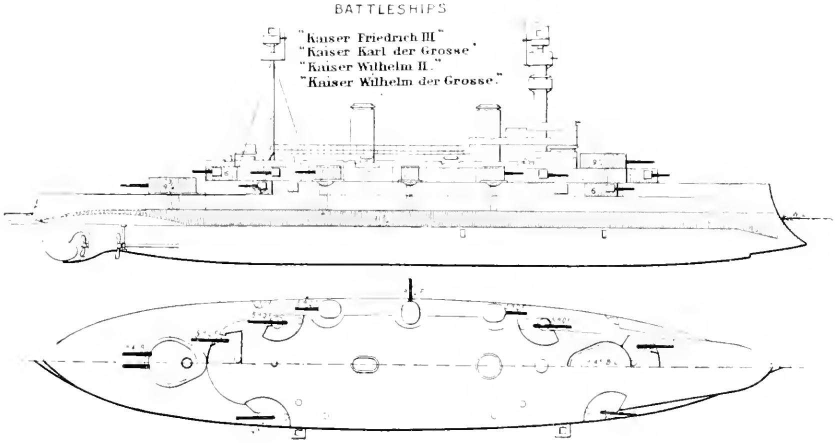
GERMANY.

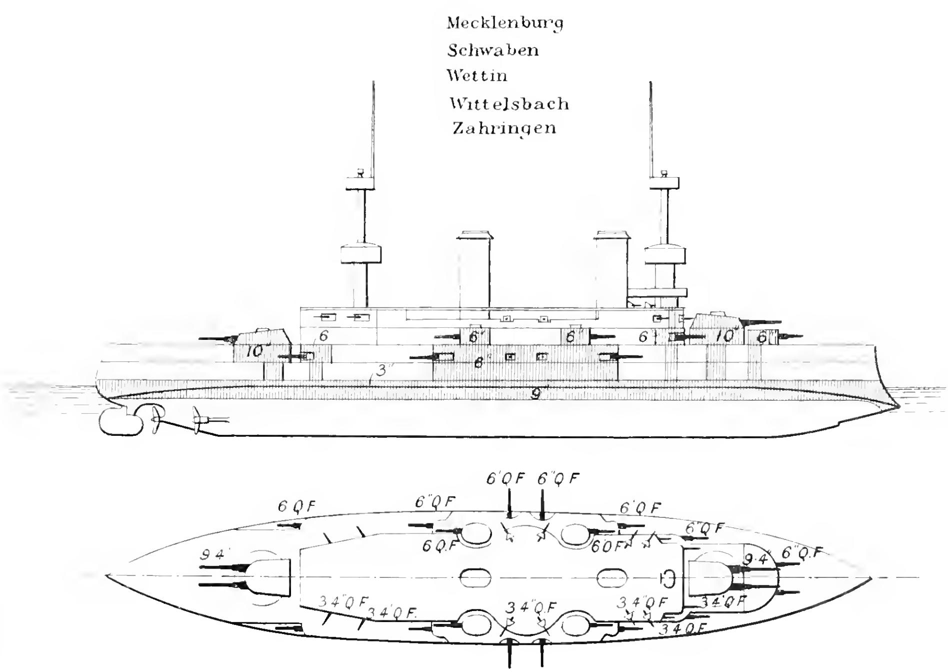

Protected Cruiser
"Gefion"
L W L


"Kaiserin Augusta"
L W L
3.5" Q.F
6" Q F
6" Q.F.
6" Q F
3.4" Q F
6" Q F
6" Q F
3.4"
3.4"
6" Q F

GERMANY.

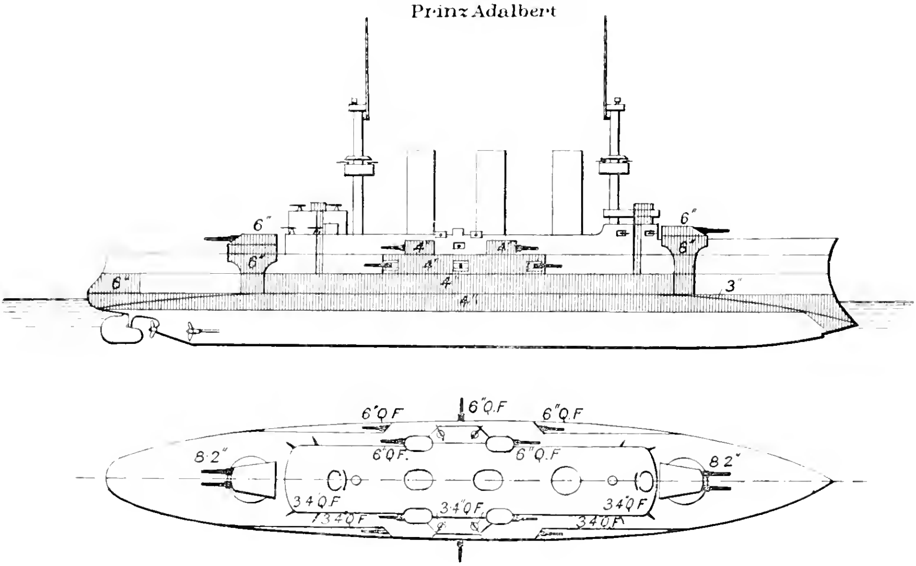
BATTLESHIPS



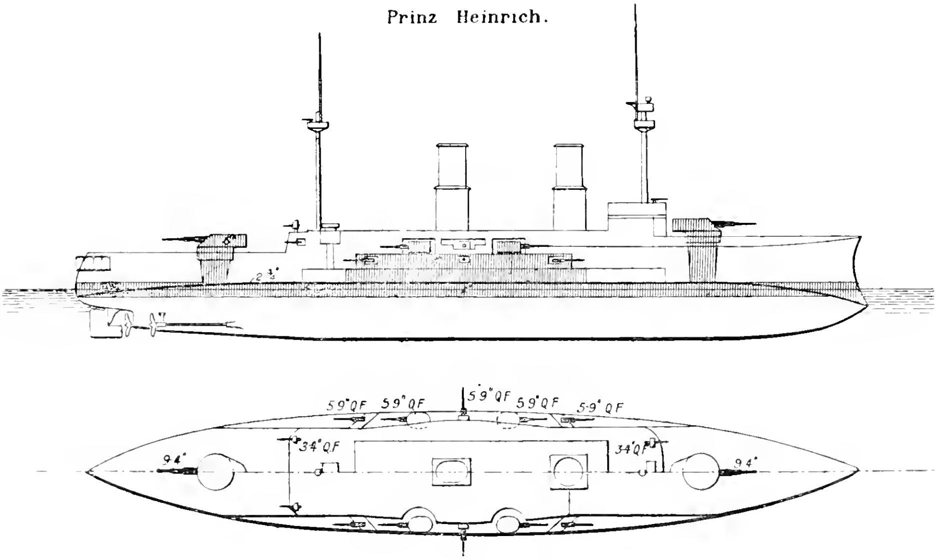


GERMANY.

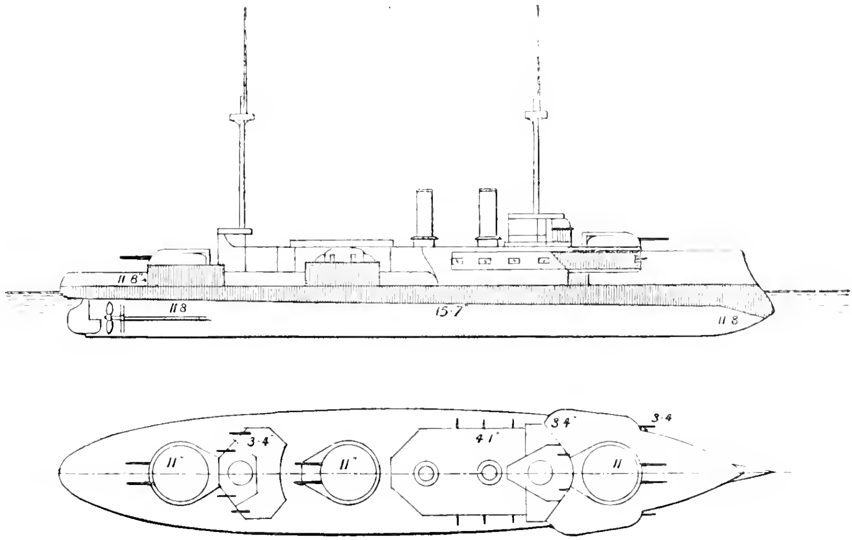
Konig Wilhelm Ersatz
Prinz Adalbert



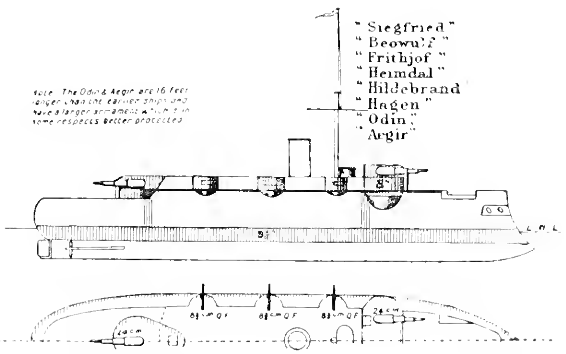
Prinz Heinrich.



Kurfurst Friedrich Wilhelm
Brandenburg.
Weissenburg
Worth



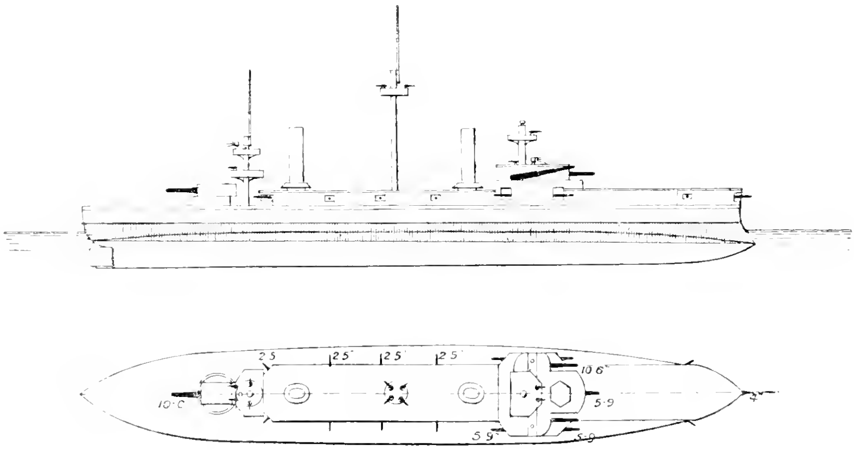
Note The Odin & Aegir are 16 feet longer than the earlier ships and have a larger armament which is in some respects better protected



N B The "Hagen" has been Lengthened 27 Feet She now has Three 9 4 in. Ten 3 4 in and Six 1 4 in Guns
The Remaining Ships of the Class will be similarly altered

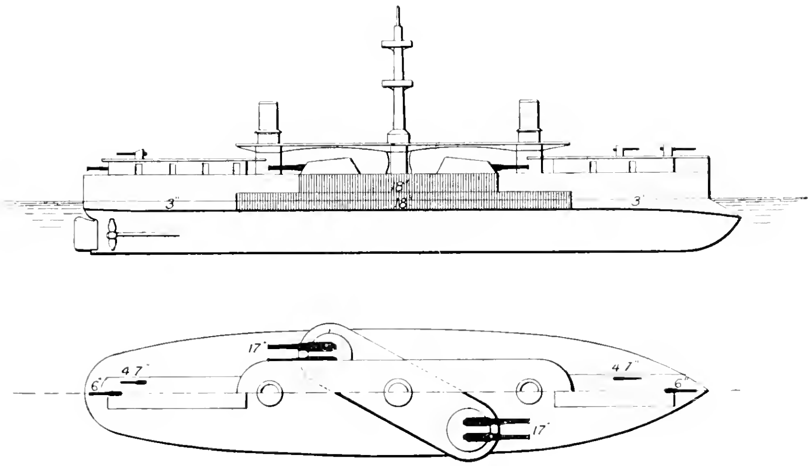
GREECE.

Hydra   Psara   Spetsai.



ITALY.

Andrea Doria
Francesco Morosini.
Ruggiero di Lauria.



"Duilio" (not rearmed)
Dandolo" (As refitted and rearmed)

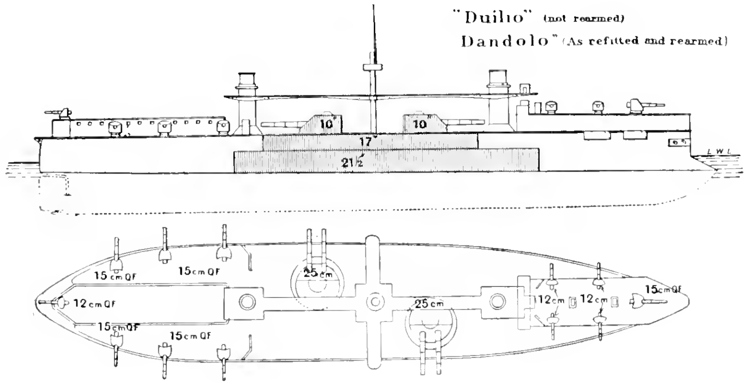
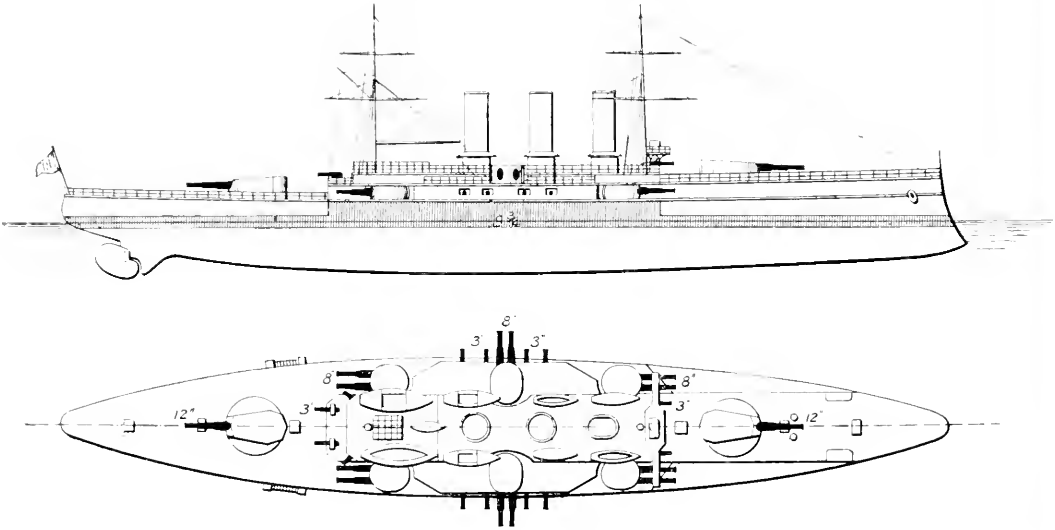


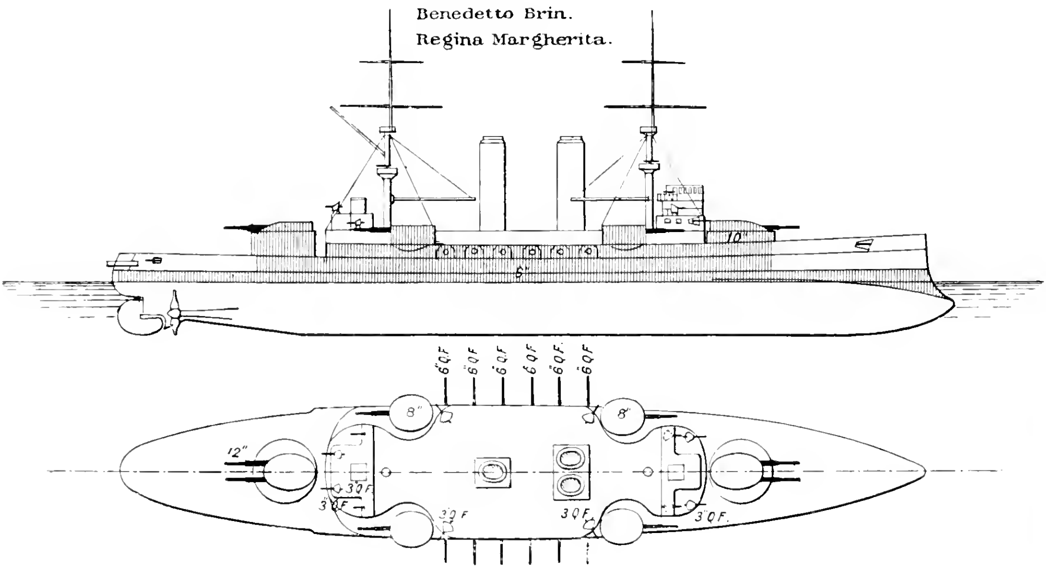
PLATE 49.

ITALY.

Vittorio Emanuele
Regina Elena.

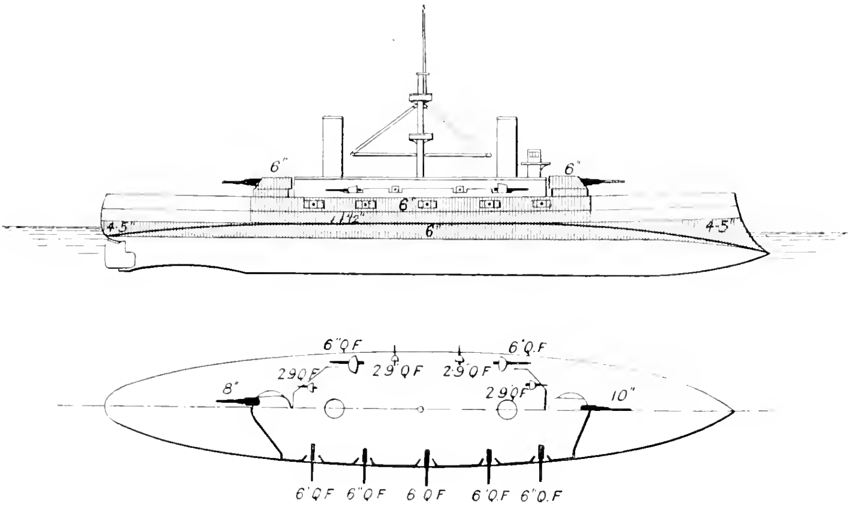


Benedetto Brin.
Regina Margherita.

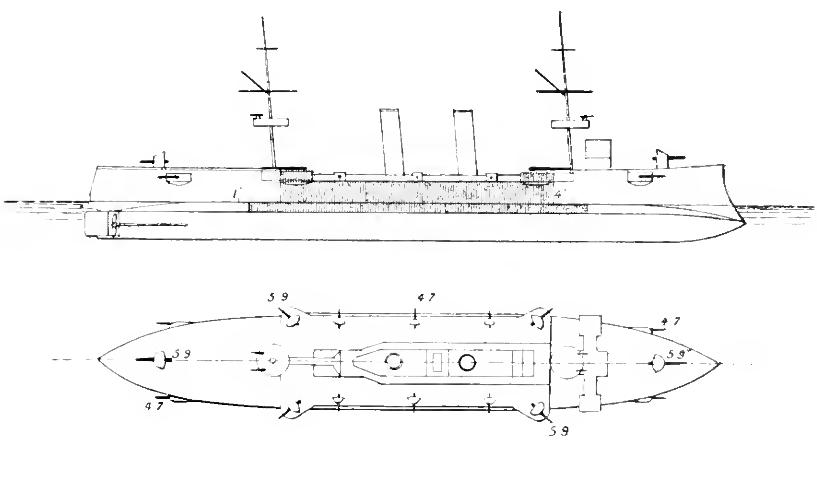


ITALY.

Guiseppe Garibaldi
Varese.
Francesco Ferrucio

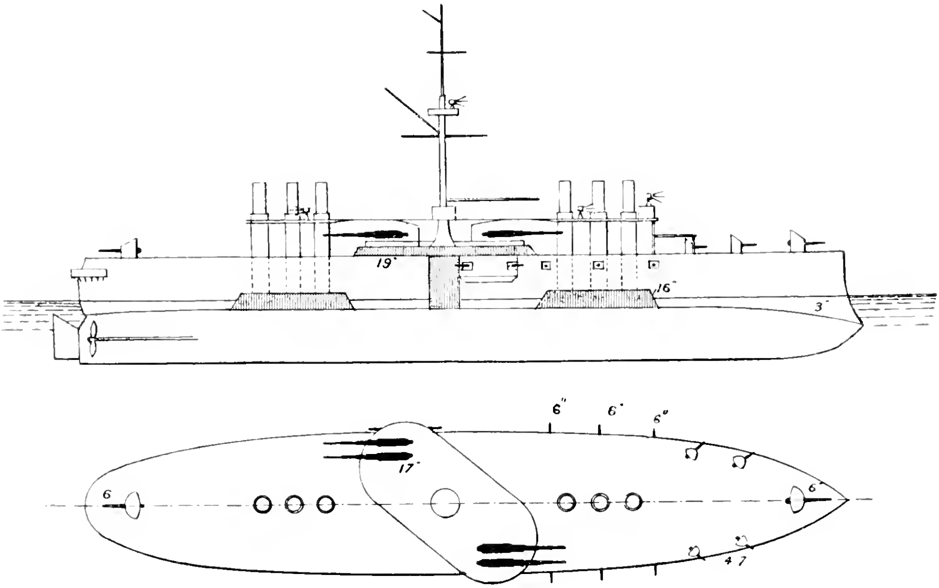


Marco Polo.

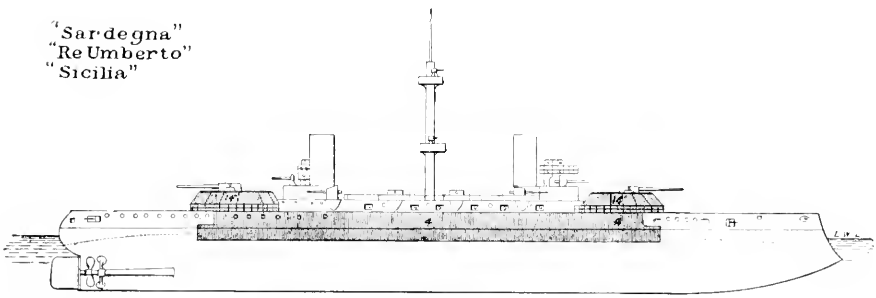


ITALY.

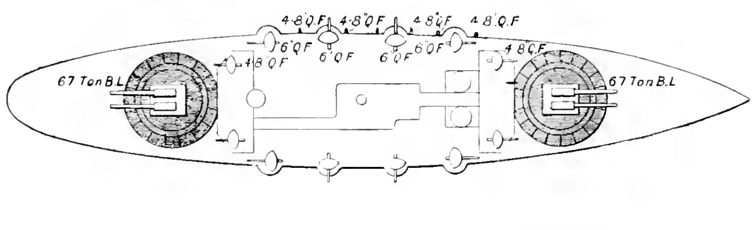
Italia
Lepanto.



"Sardegna"
"Re Umberto"
"Sicilia"

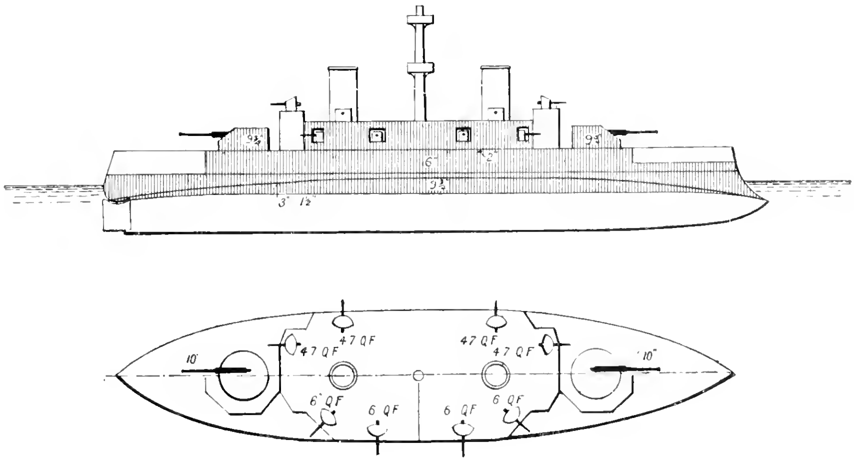


Note Sardegna is 3 ft 3in. longer and 3 ft 3in broader than the other two

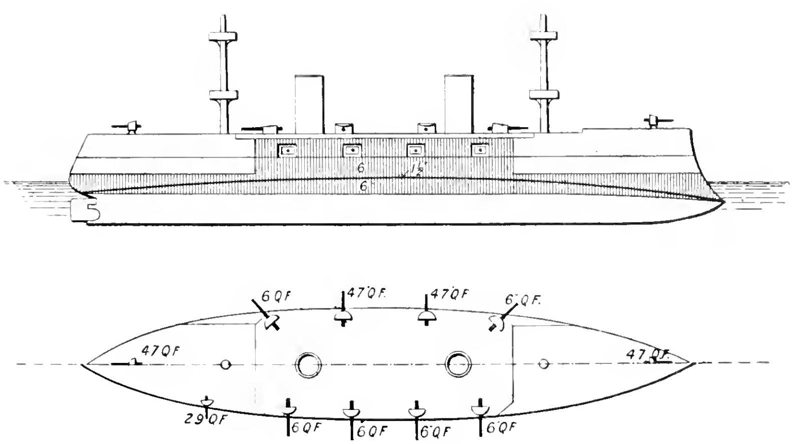


ITALY.

Ammiraglio Di St. Bon
Emanuele Filiberto

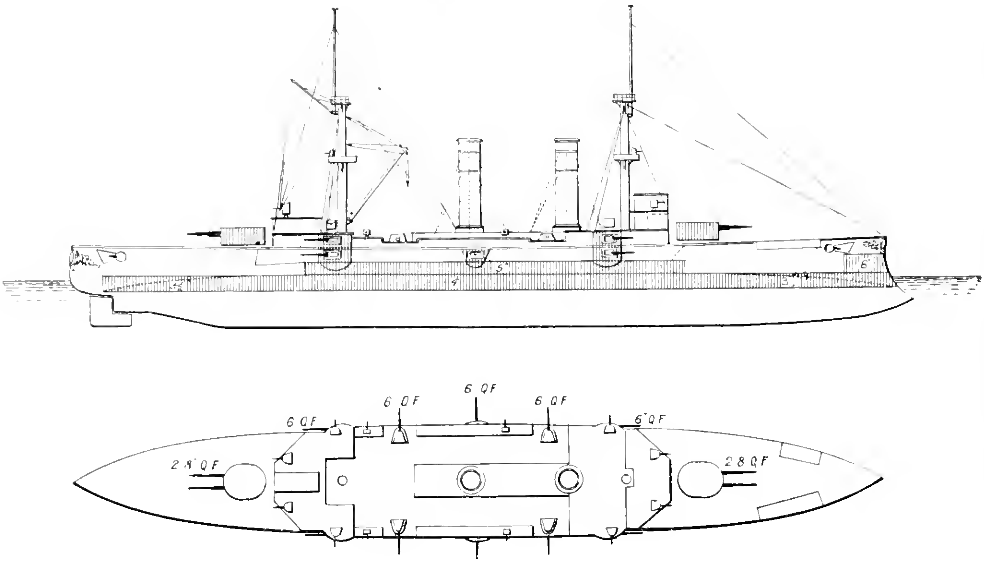


"Carlo Alberto"
"Vettor Pisani"



JAPAN.

Asama and Tokiwa



TAKASAGO.

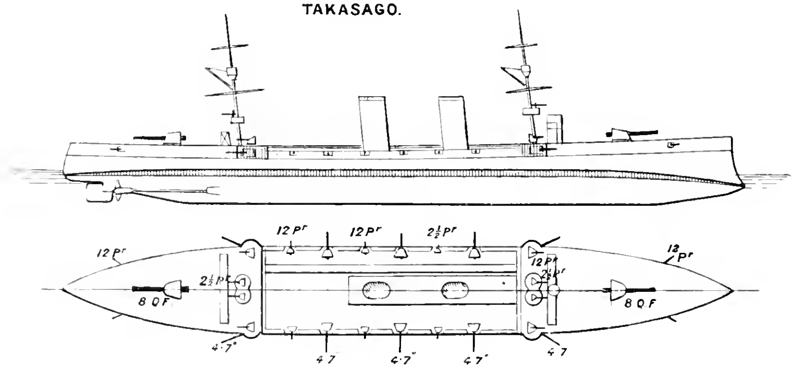
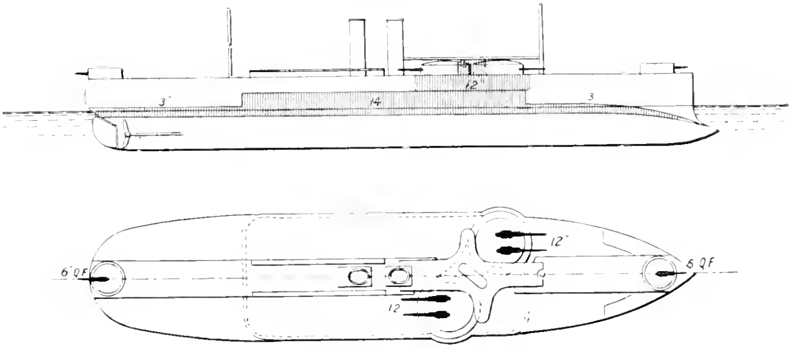


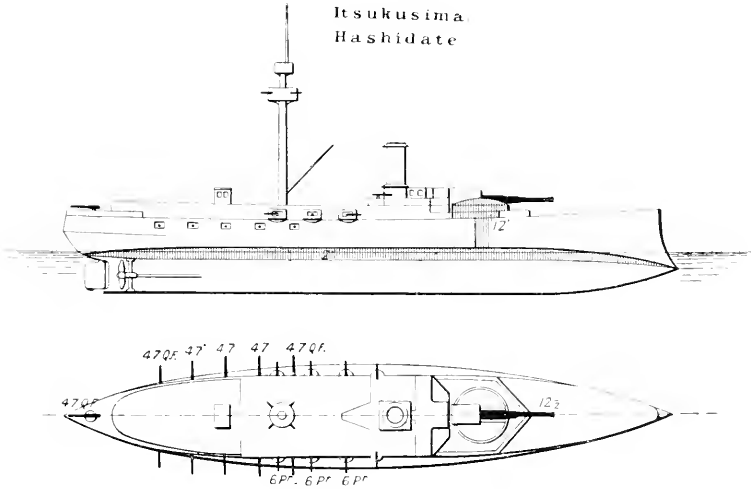
Plate 54.

JAPAN.

Chin Yuen.

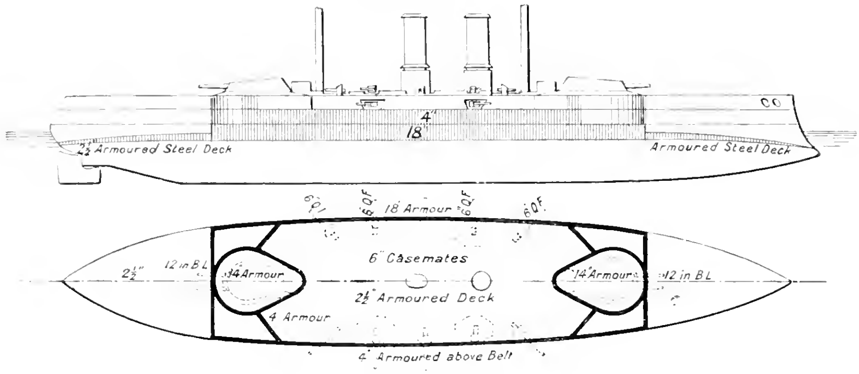


Itsukusima.
Hashidate

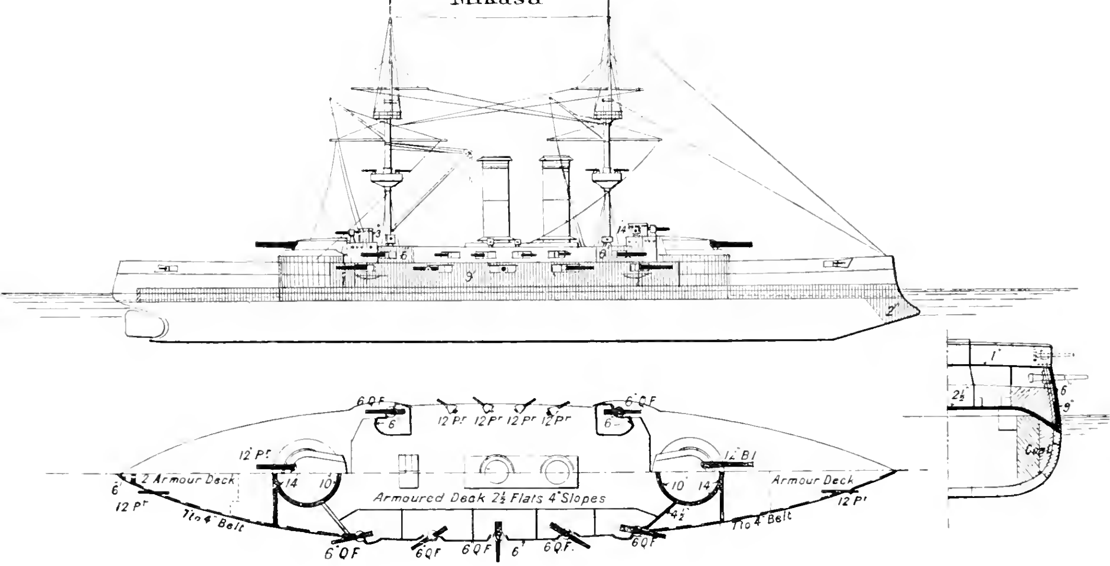


JAPAN.

First Class Battleship
"Fuji."
"Yashima".

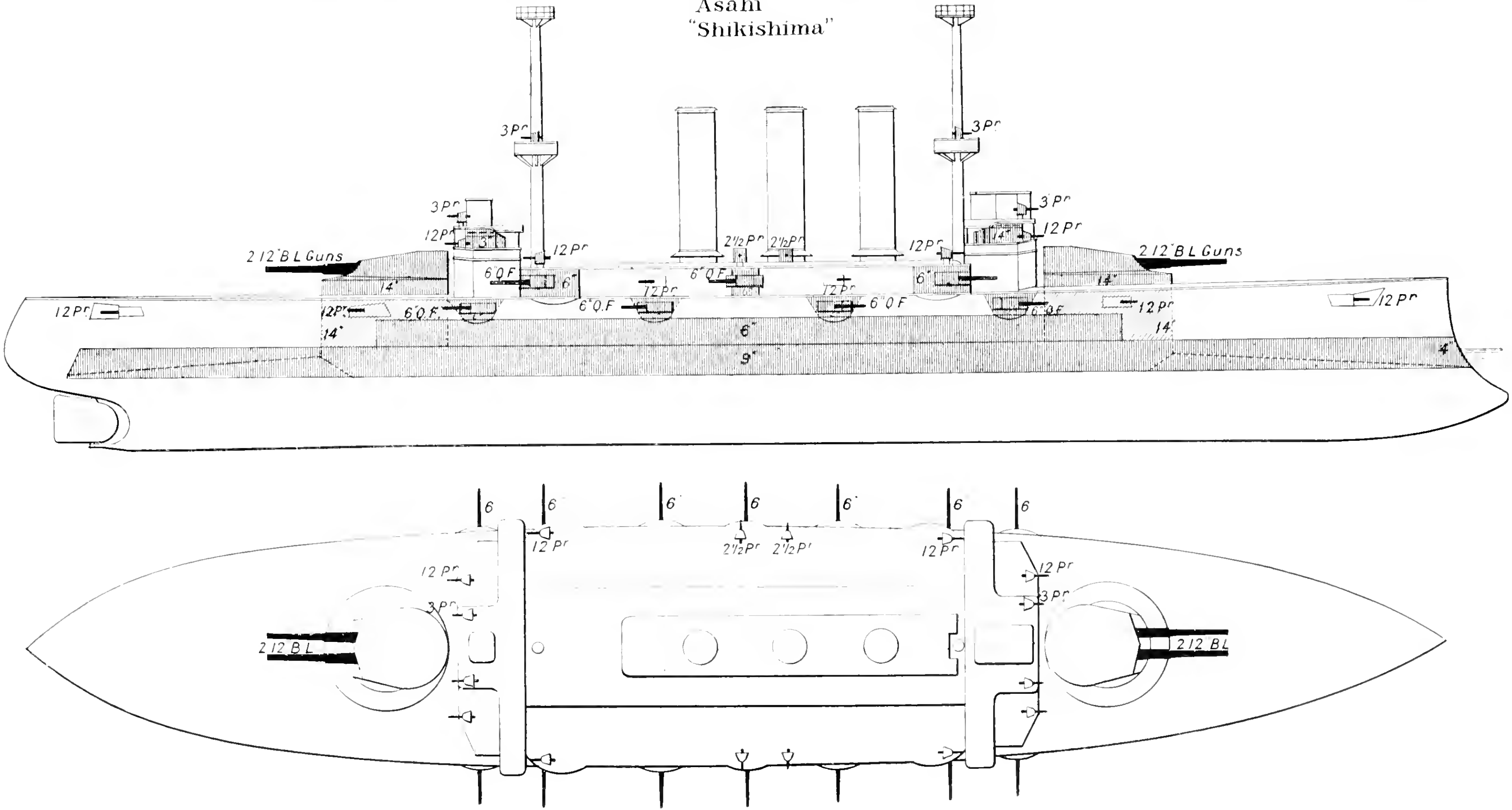


BATTLESHIP
"Mikasa"



JAPAN.

BATTLE-SHIP.
"Hatsuse."
"Asahi"
"Shikishima"

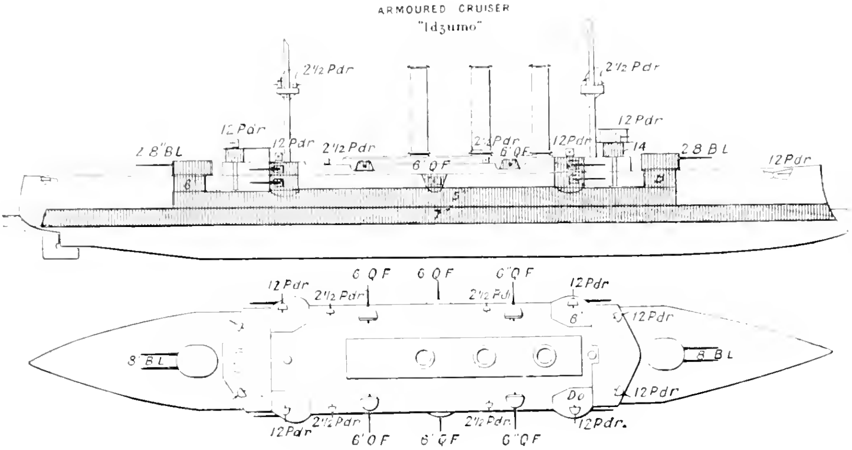


The "Asahi" & "Shikishima" Have but Two Funnels

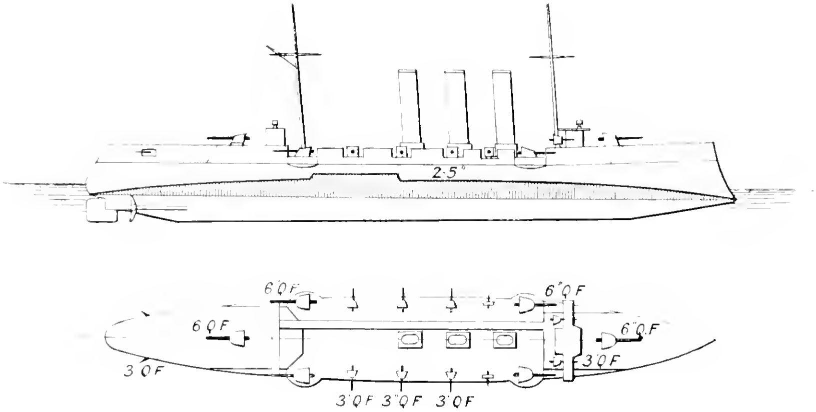
PLATE 57.

JAPAN.

ARMOURED CRUISER
"Idzumo"

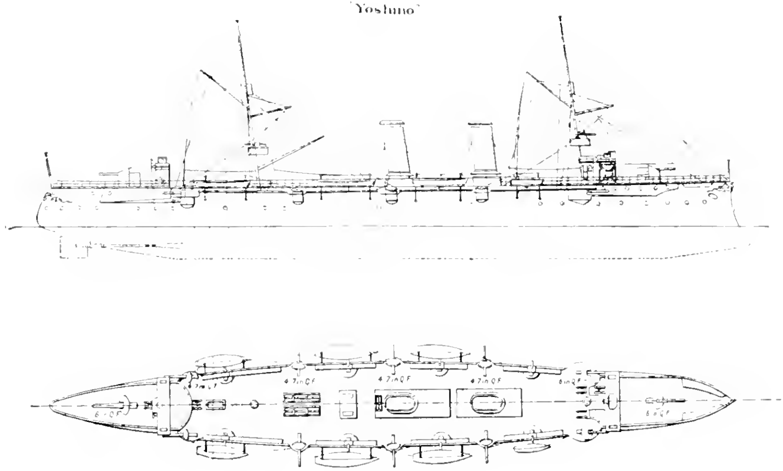


Nutaka
Tsushima

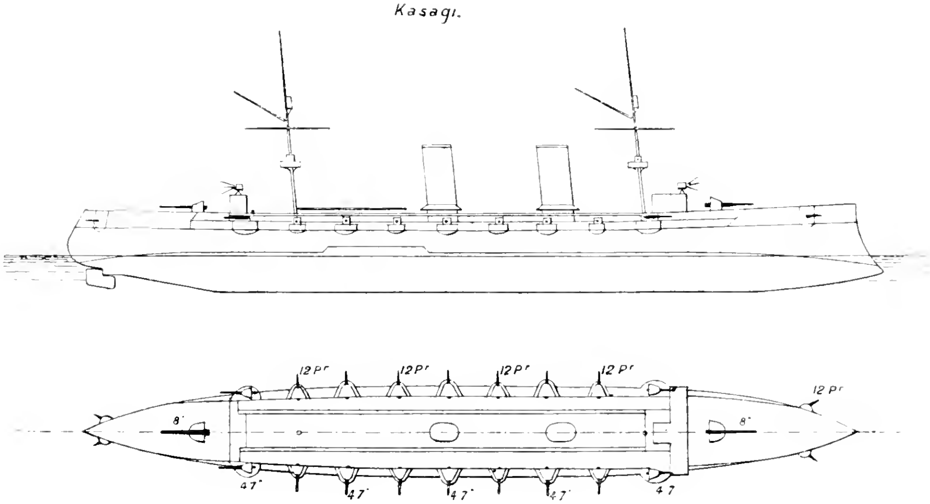


JAPAN.

'Yoshino'

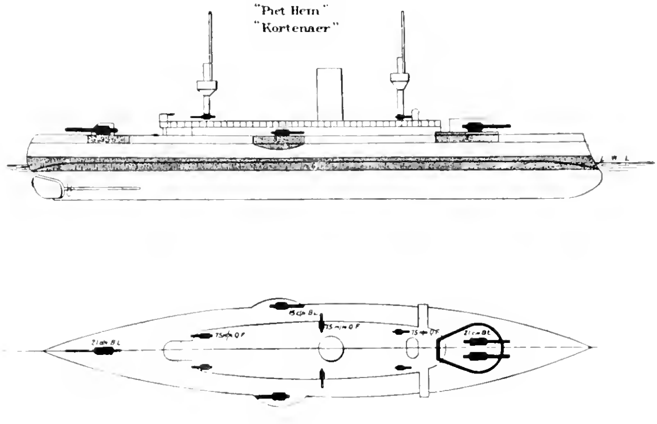


Kasagi.

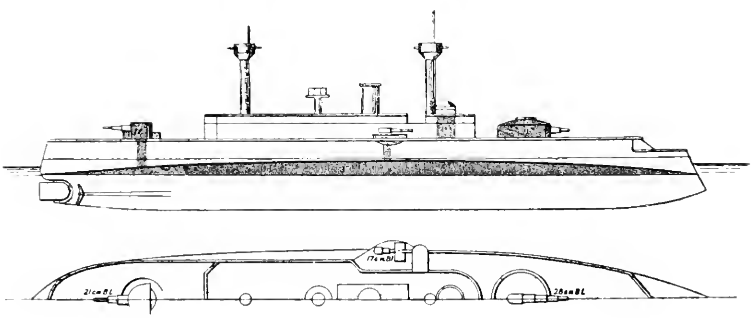


NETHERLANDS.

"Evertsen"
"Piet Hein"
"Kortenaer"

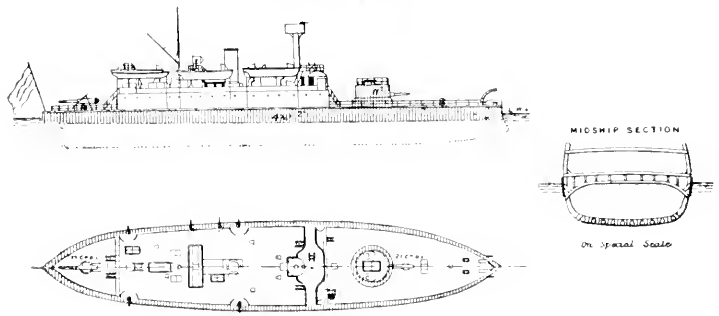


Koningin Wilhelmina de Nederlanden

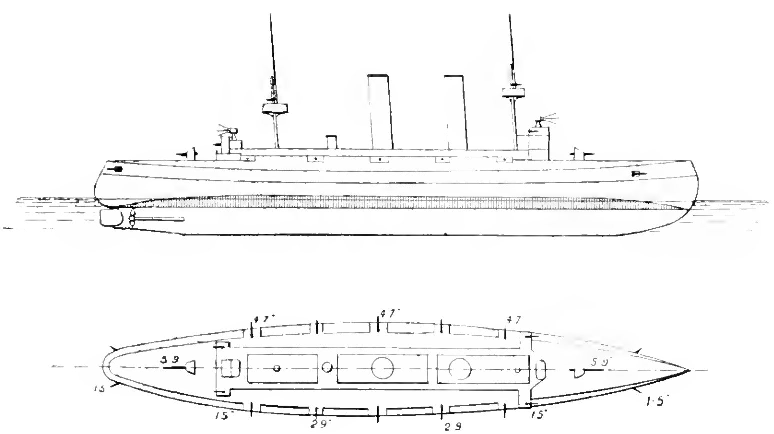


NETHERLANDS.

"Reinier Claesen"

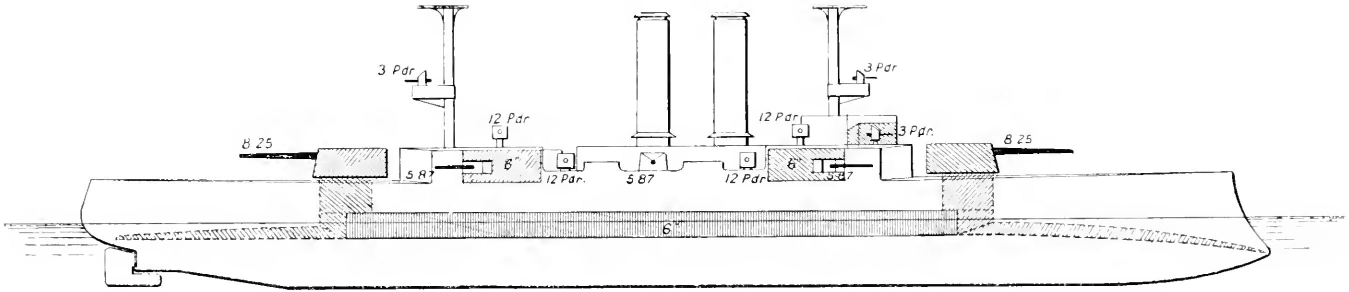


Holland



NORWAY.

ARMOUR-CLADS.
"Norge"
"Eidsvold"



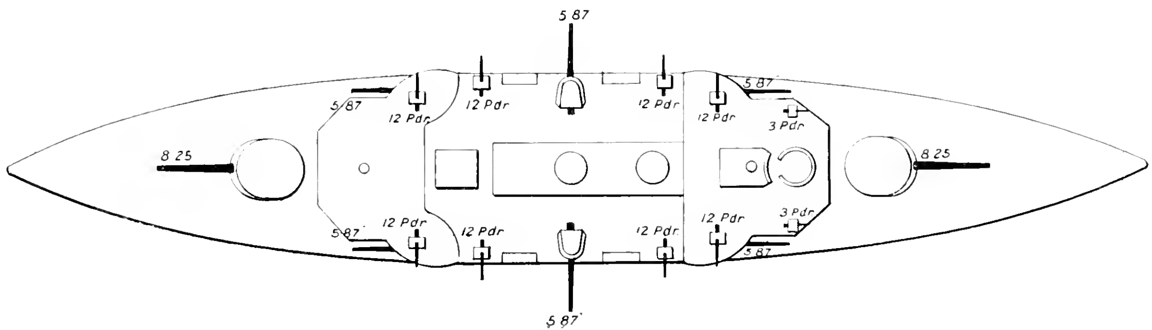
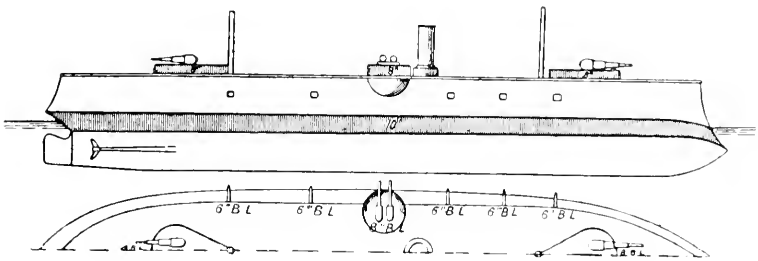


PLATE 62.

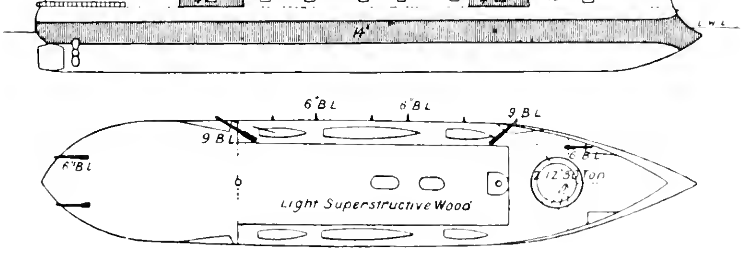
RUSSIA.

ARMOURED CRUISER

Admiral Nachimoff

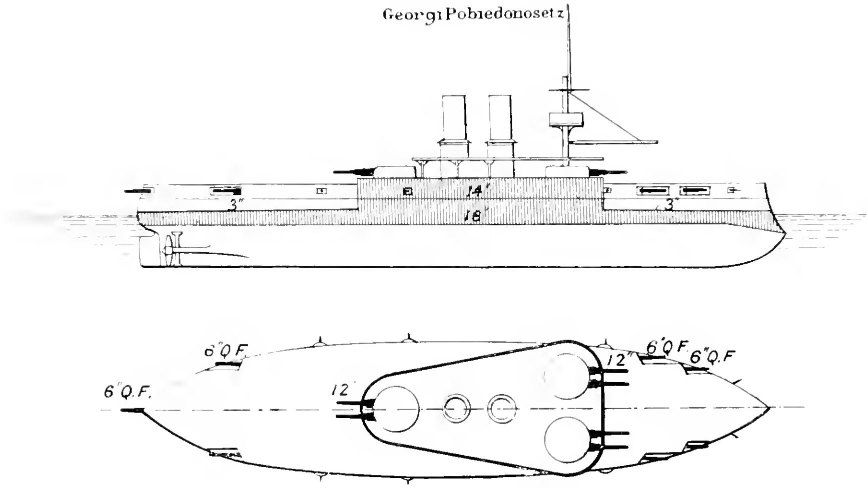


"Alexander II"

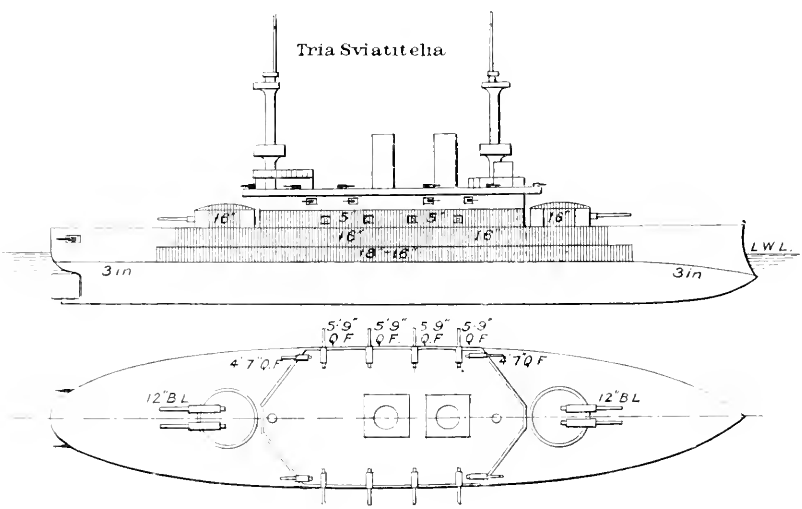


RUSSIA.

Catherine II
Tchesme
Sinope
Georgi Pobiedonosetz

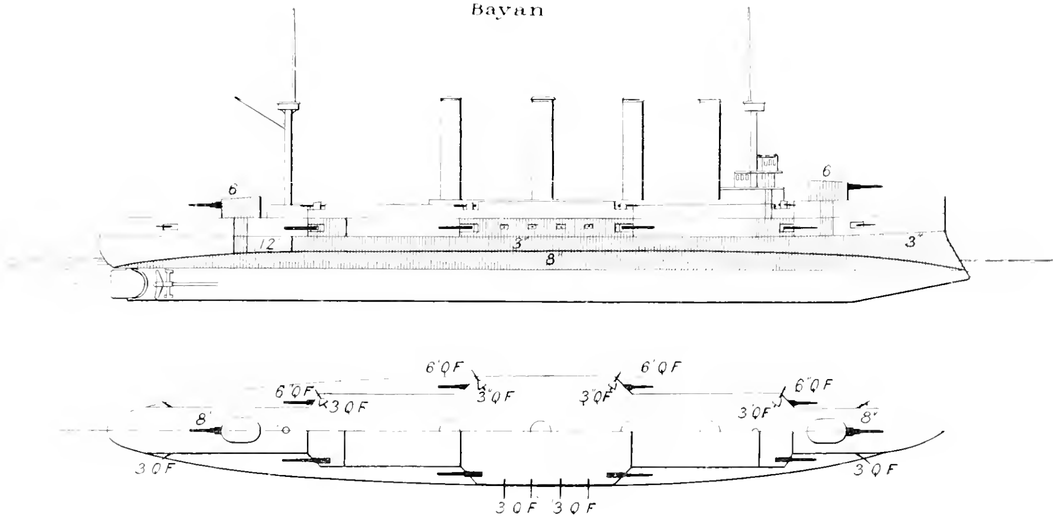


Tria Sviatitelia

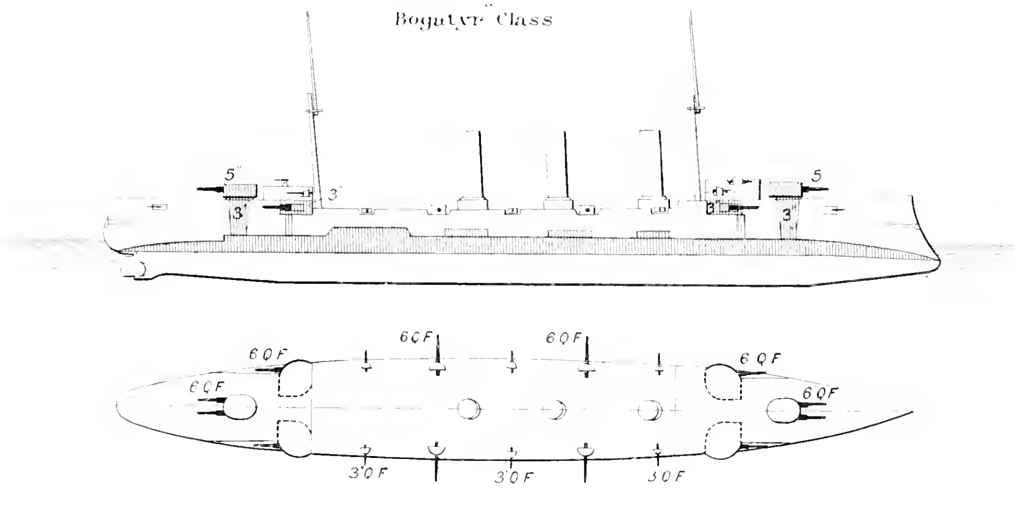


RUSSIA.

Bayan



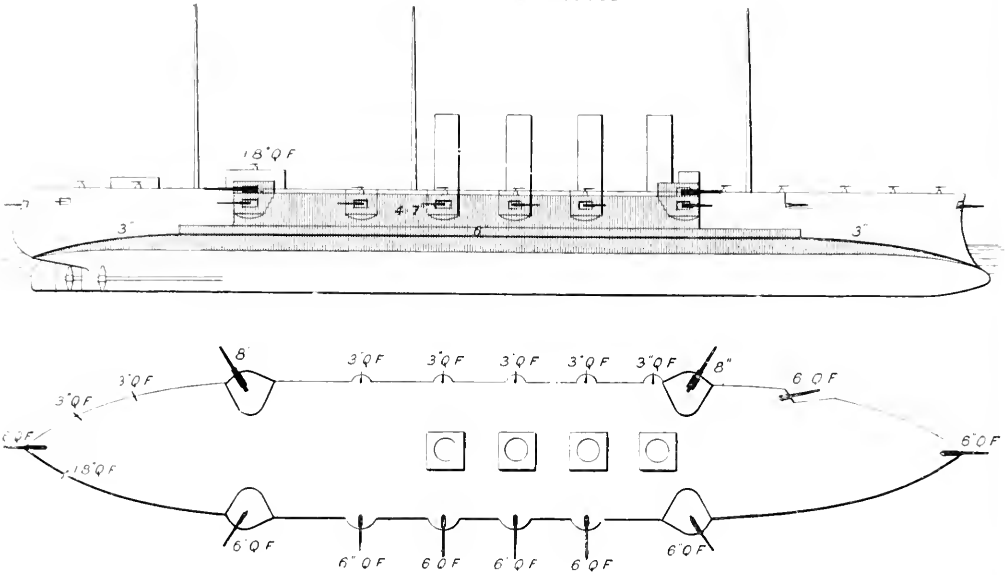
Bogatyr Class



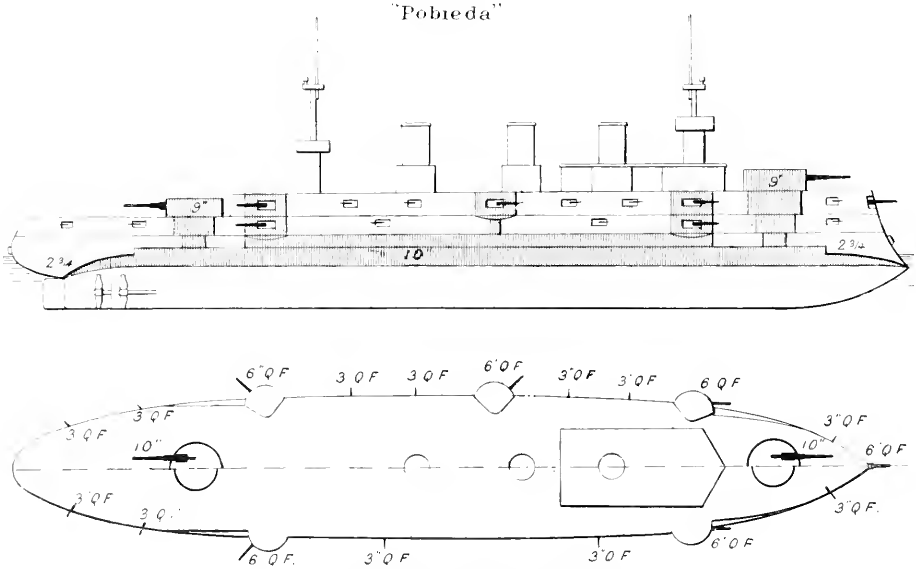
f

RUSSIA

ARMOURED CRUISER
"Gromoboi"



FIRST CLASS BATTLE-SHIPS
"Oslabya"
"Peresviet"
"Pobieda"

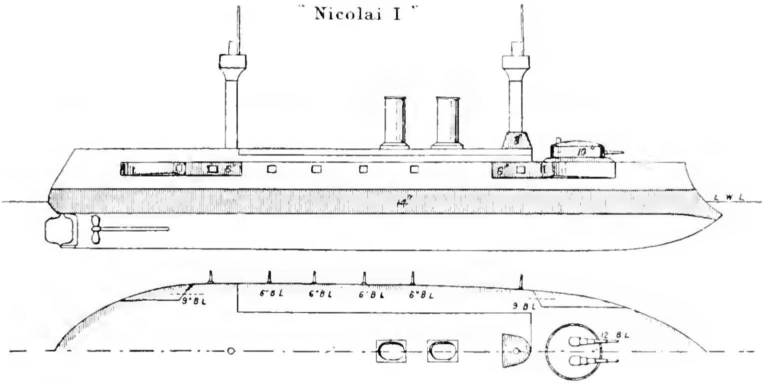


Note In the "Pobieda" the Belt Extends the Full Length of the Ship

RUSSIA.

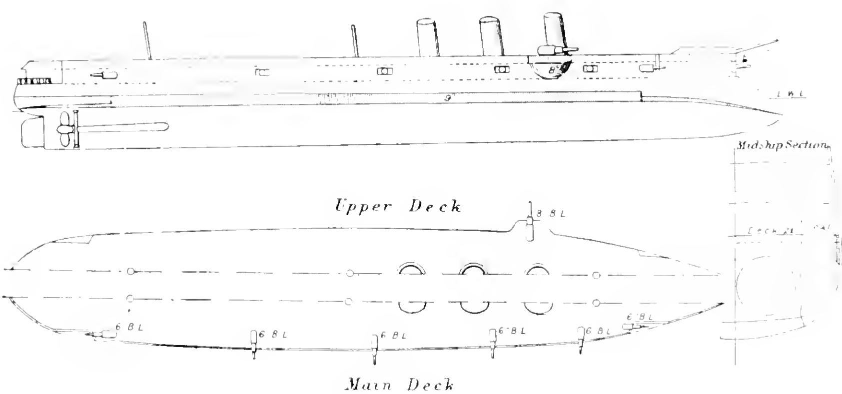
BATTLE SHIP

"Nicolai I"



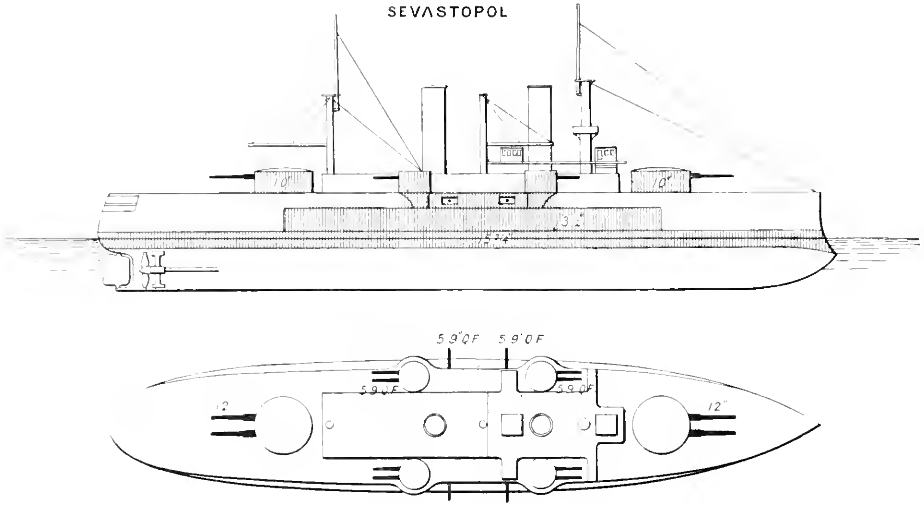
ARMOURED CRUISER

"Pamyat Azova"

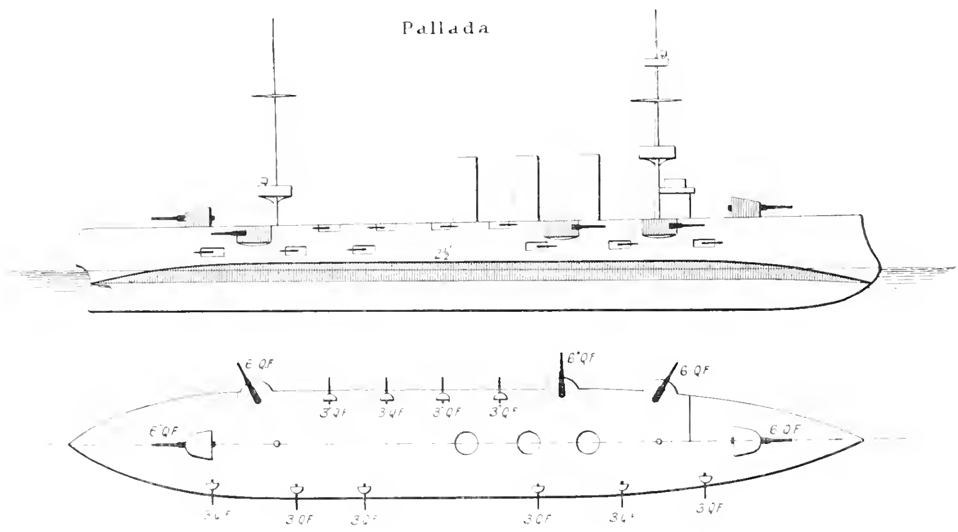


RUSSIA.

PETROPAVLOVSK
POLTAVA
SEVASTOPOL

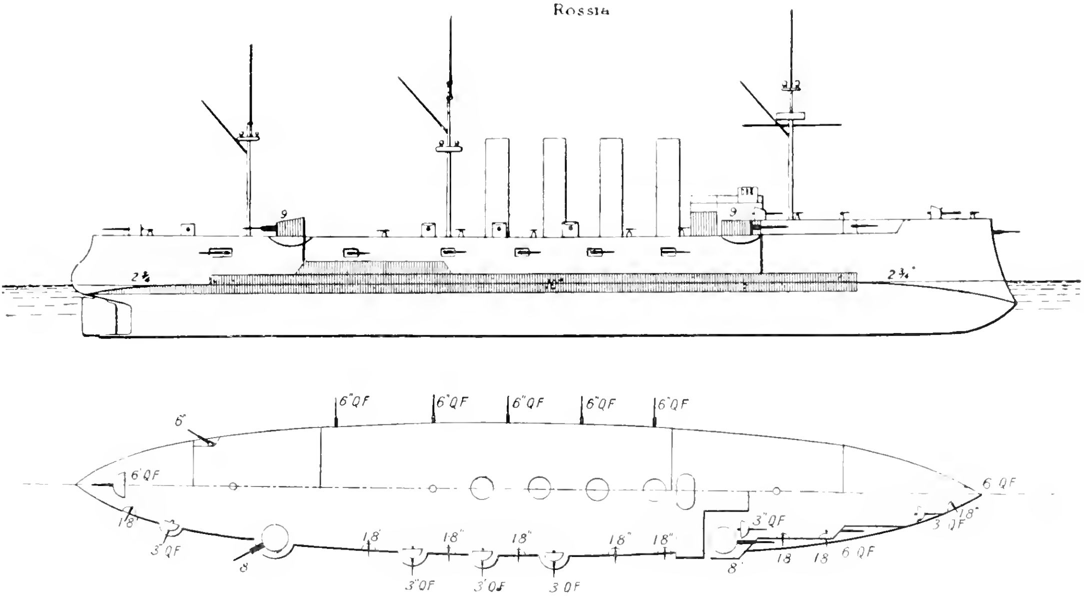


Pallada

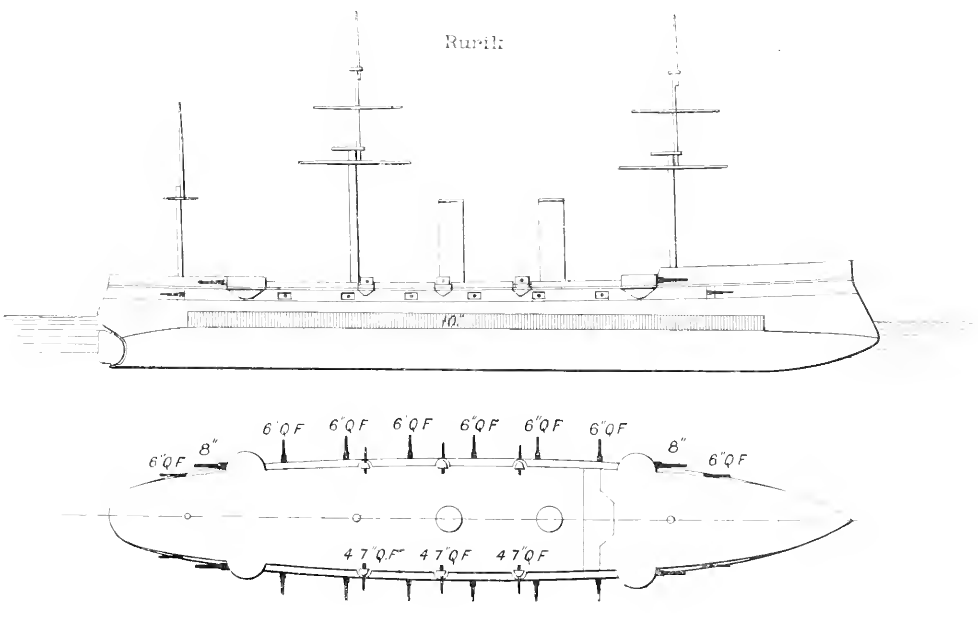


RUSSIA.

Rossia

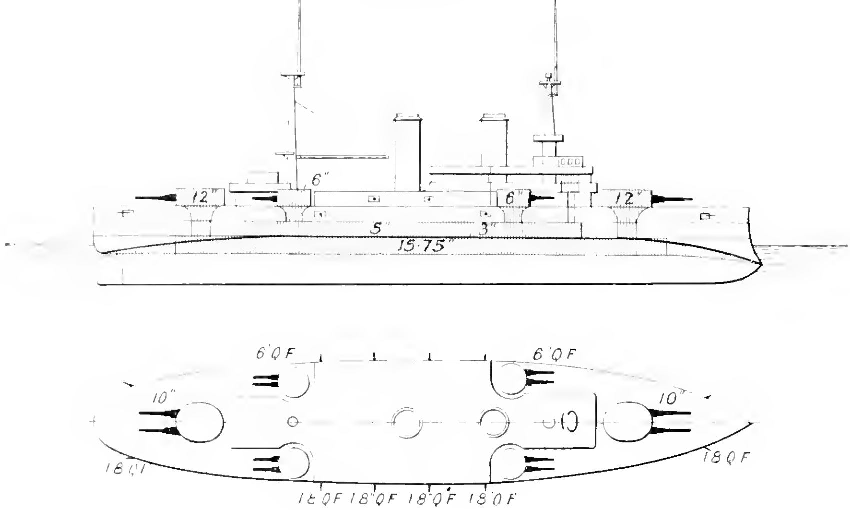


Rurik

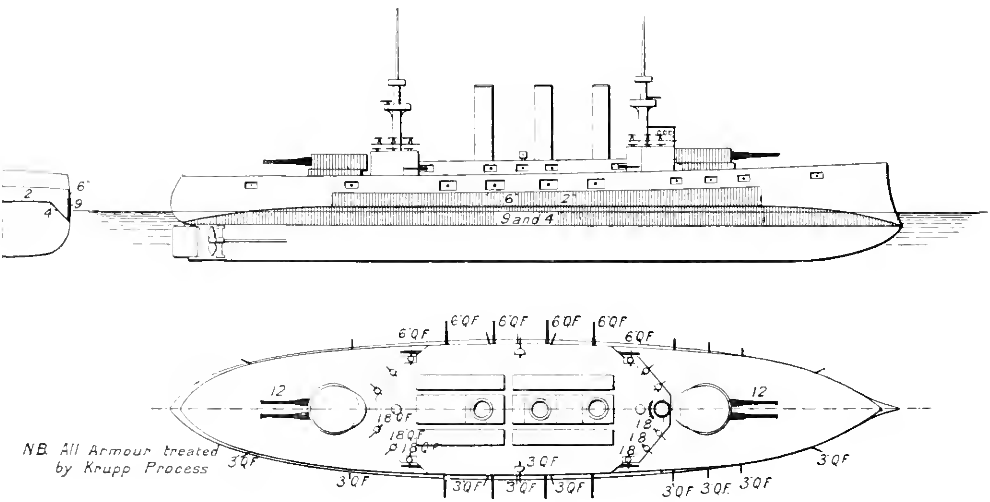


RUSSIA.

Rostislav

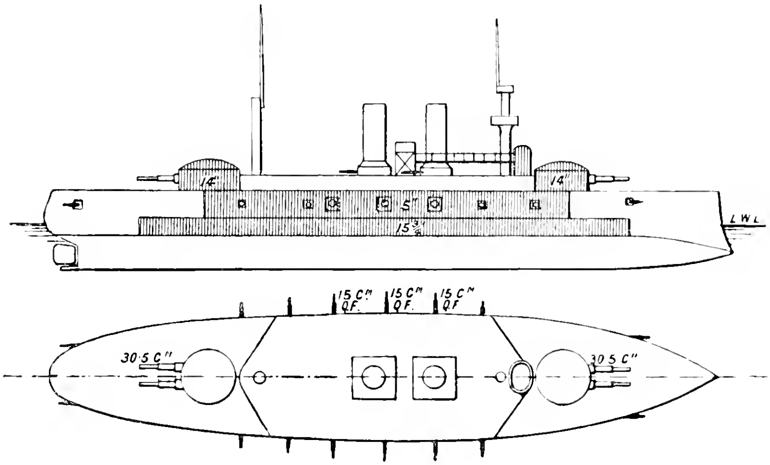


"Retwisan"

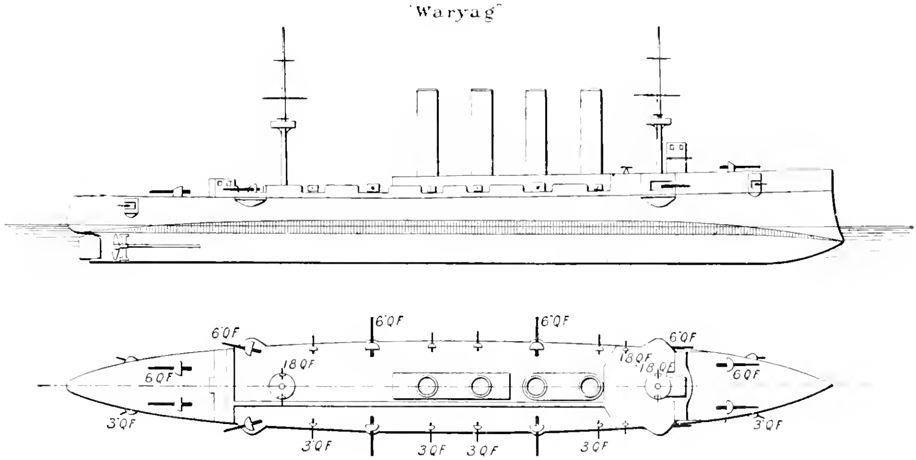


RUSSIA.

"Sissoi Veliky'

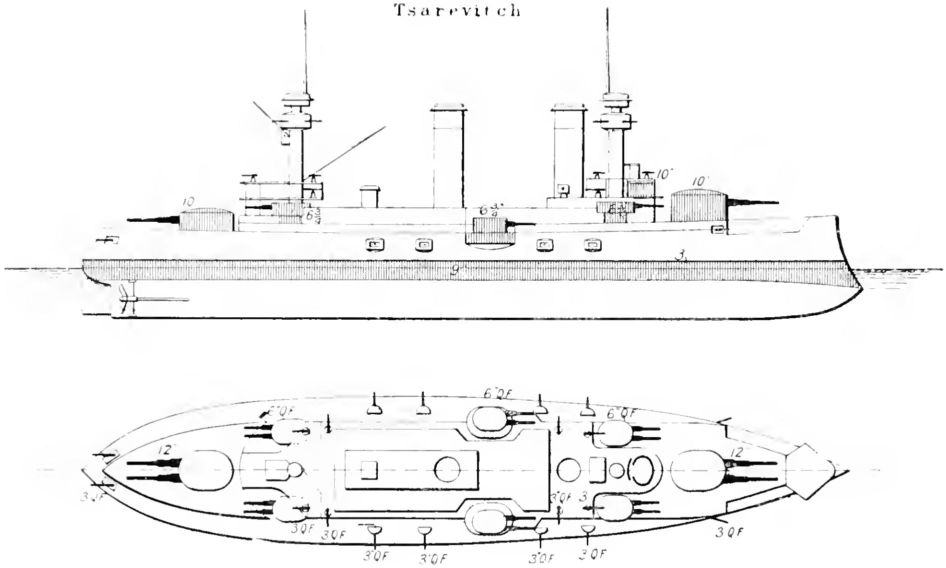


'Waryag"

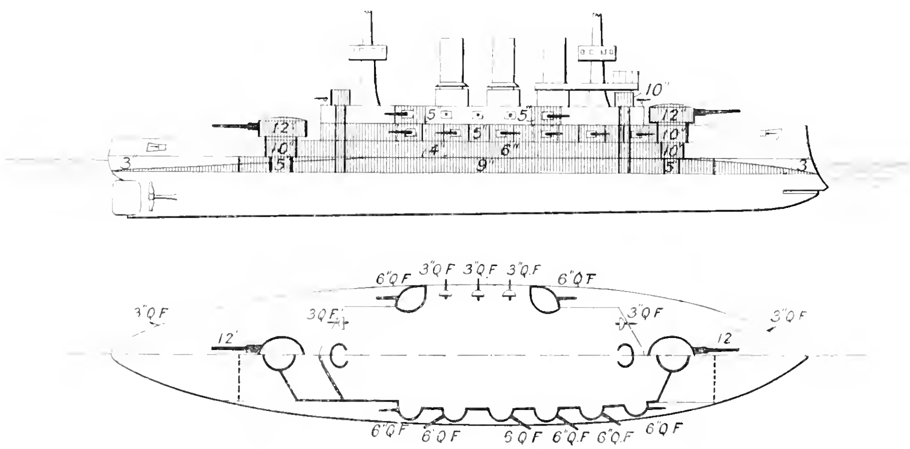


RUSSIA.

Tsarevitch

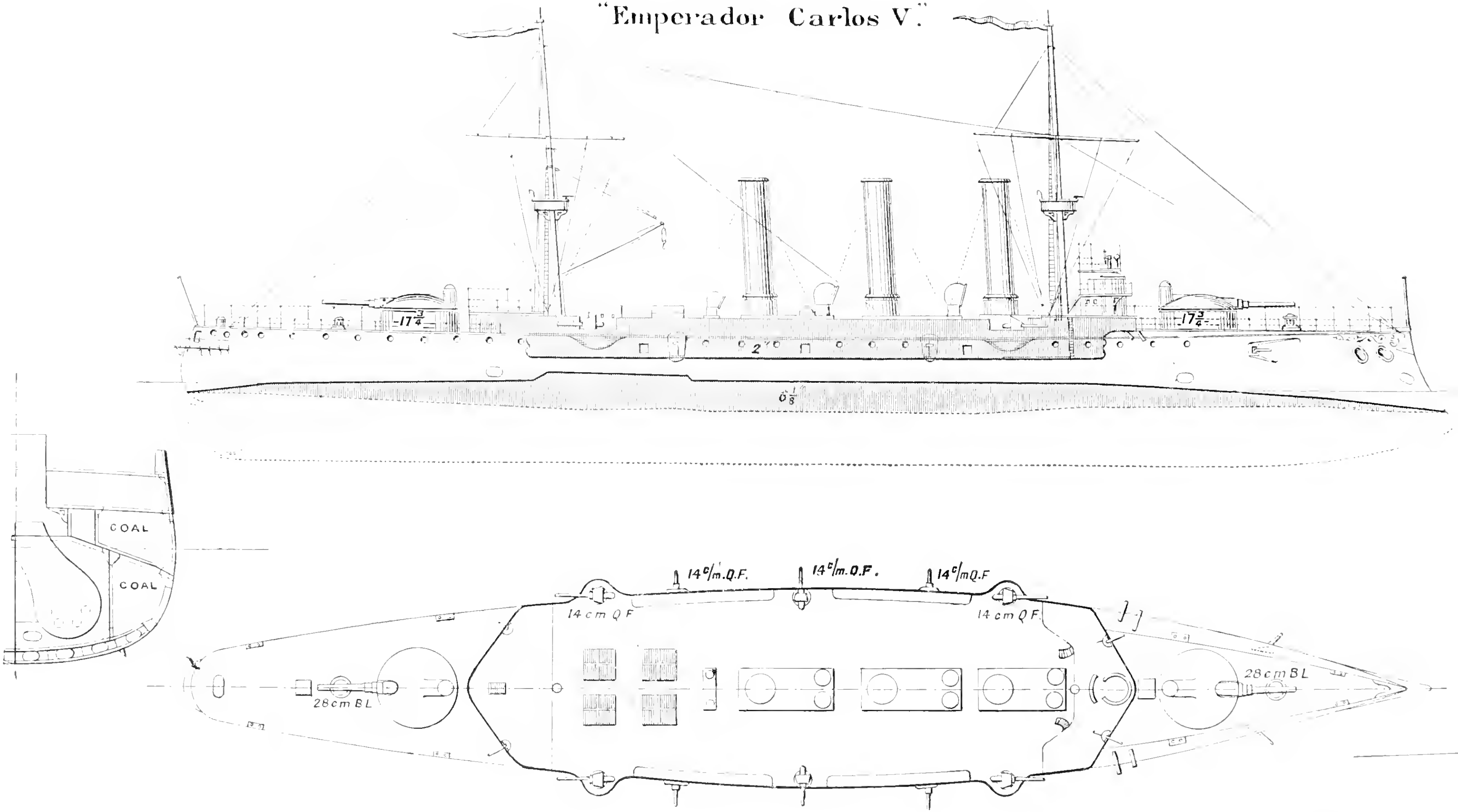


Kniaz Potemkin Tavritchesky



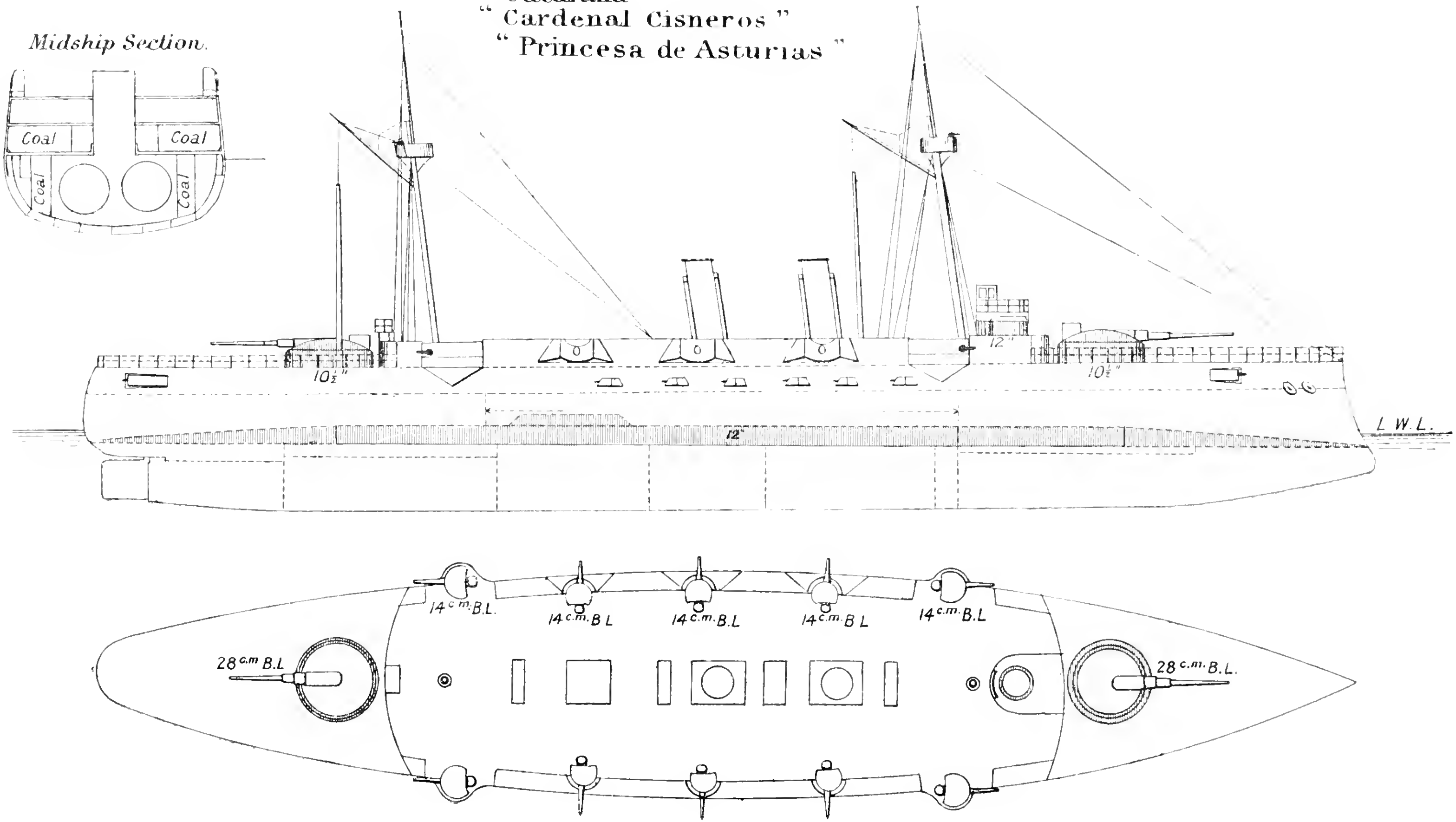
SPAIN.

"Emperador Carlos V."



PLA

" Cataluña "
" Cardenal Cisneros "
" Princesa de Asturias "



SPAIN

" Pelayo "

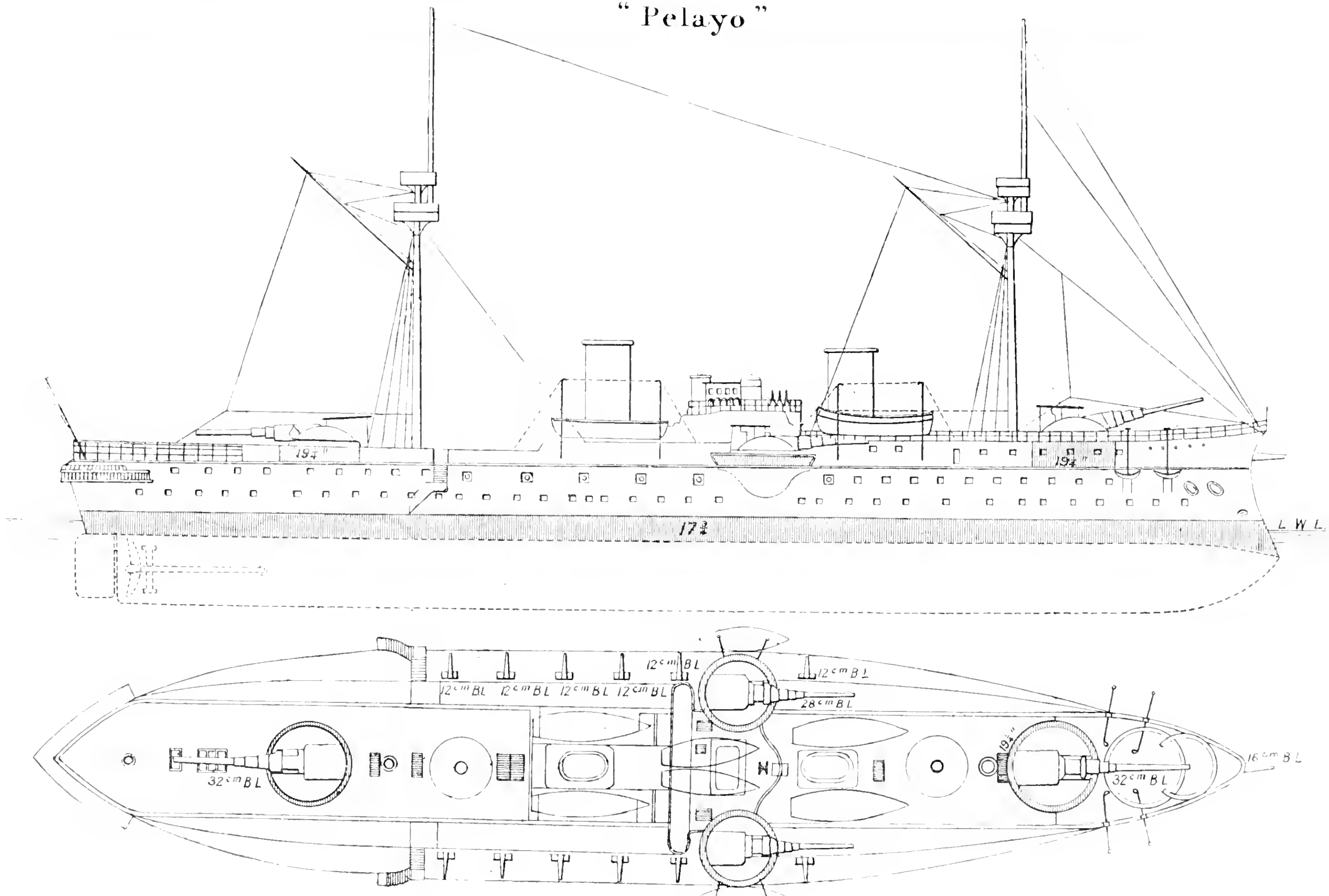


Plate 75.

SWEDEN

COAST DEFENCE SHIPS.

"Wasa."
"Aeran."
"Tapperheten."

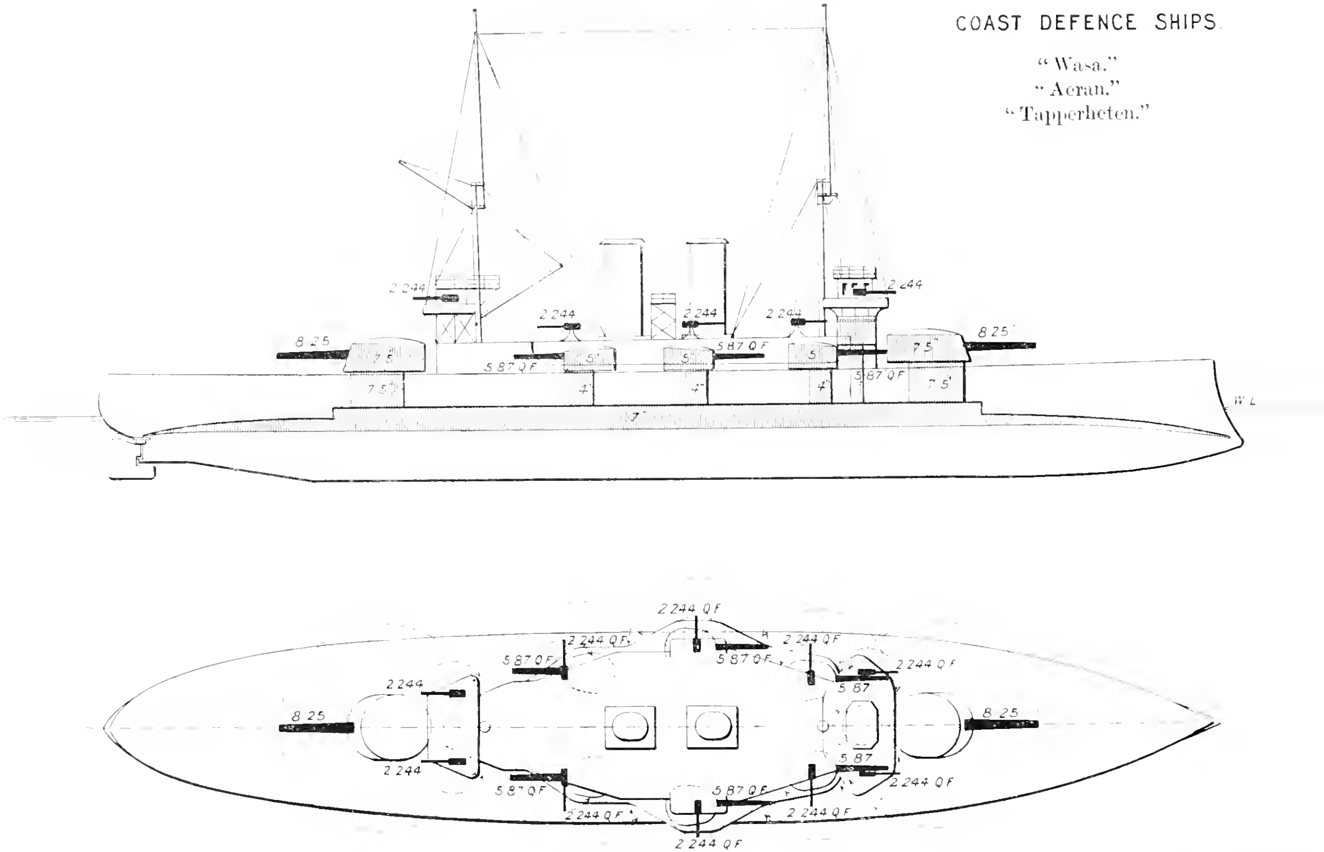
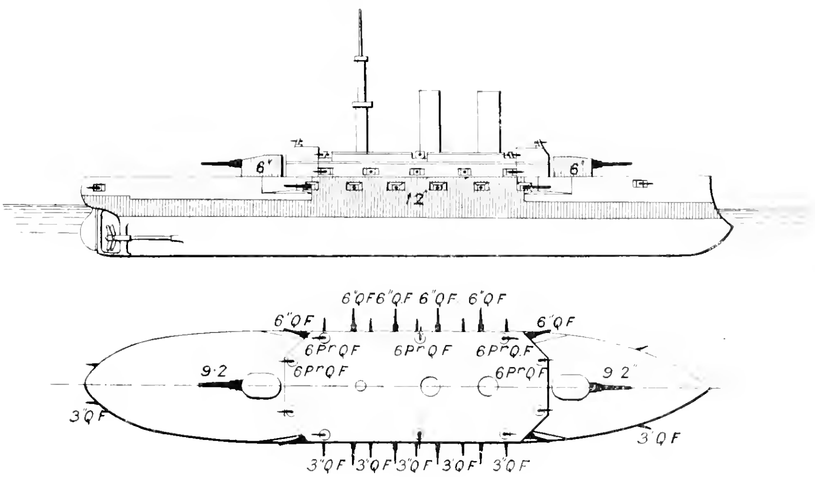


PLATE 76.

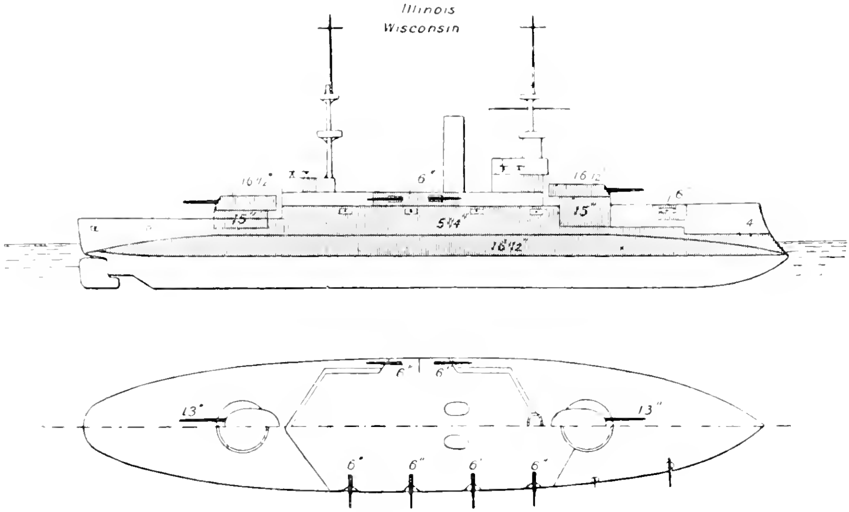
TURKEY

Messoudieh.

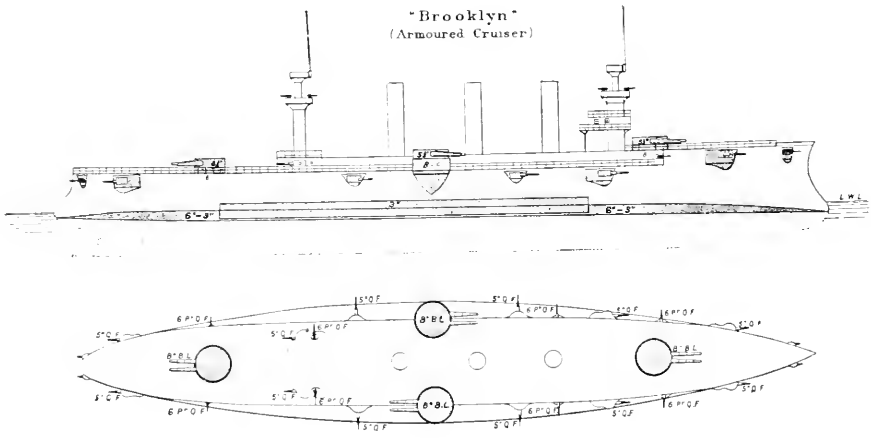


UNITED STATES

Alabama
Illinois
Wisconsin

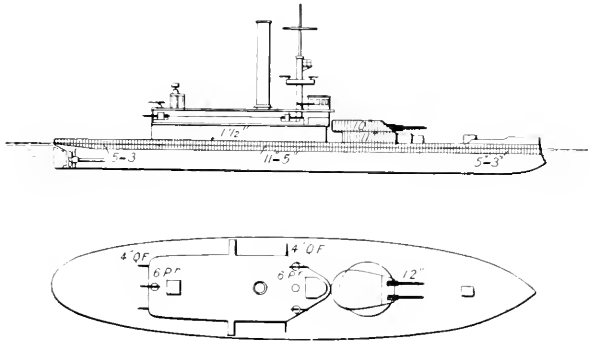


"Brooklyn"
(Armoured Cruiser)

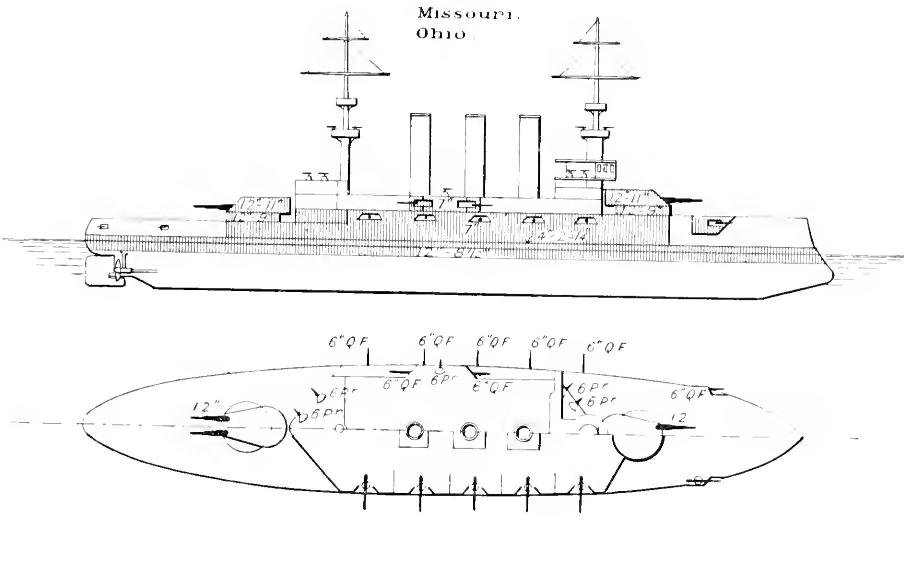


UNITED STATES.

ARKANSAS

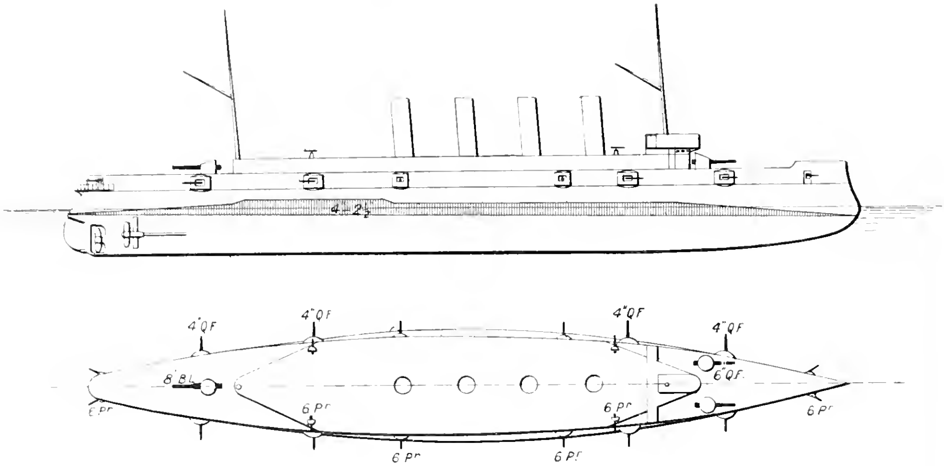


Maine
Missouri.
Ohio.



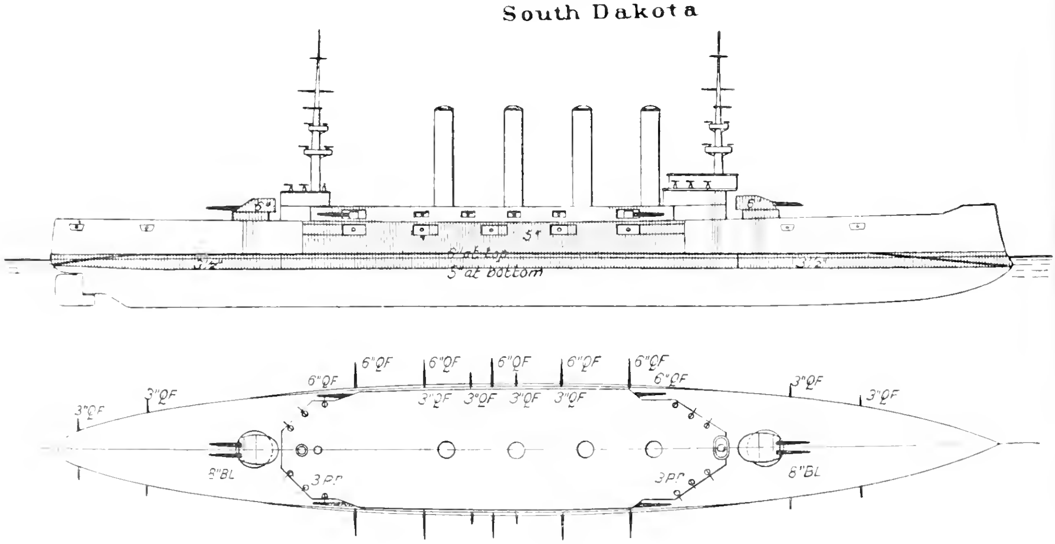
UNITED STATES.

Columbia.
Minneapolis



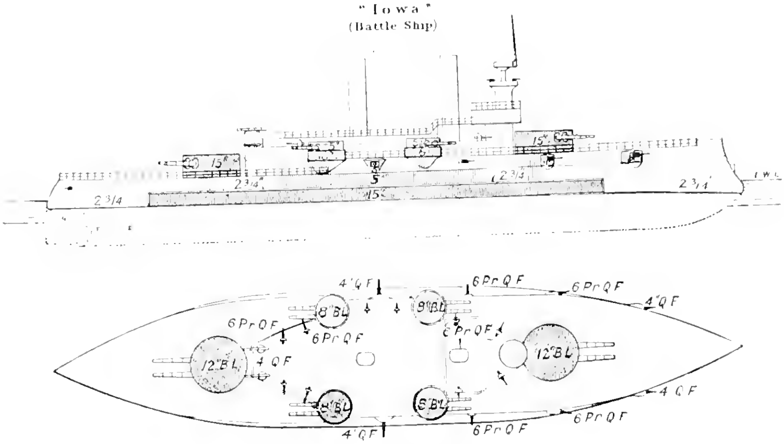
Note - *Minneapolis has only two funnels.*

California.
Pennsylvania.
West Virginia
Colorado
Maryland
South Dakota

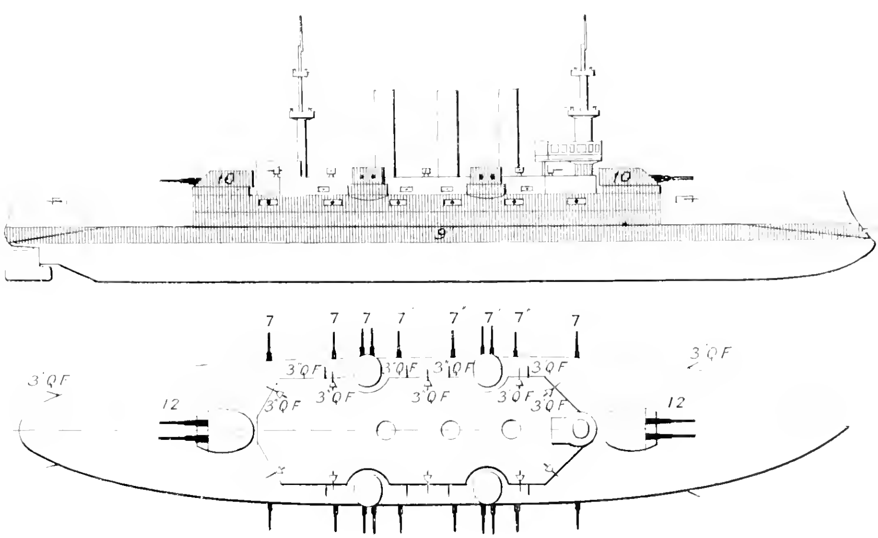


UNITED STATES.

"Iowa"
(Battle Ship)

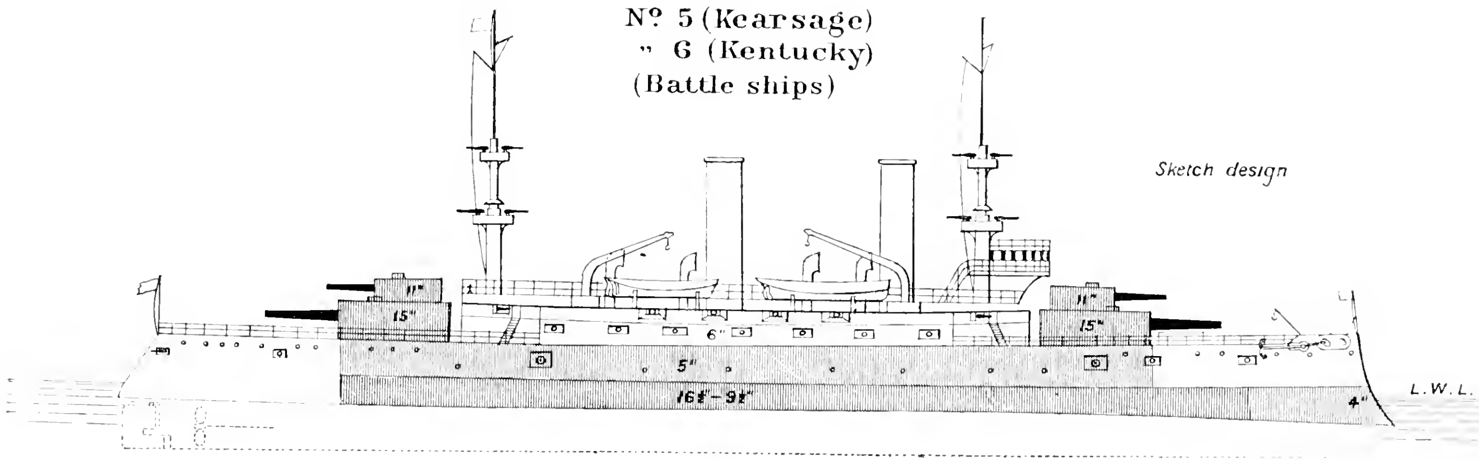


Design for
New Battleships



UNITED STATES.

No. 5 (Kearsage)
" 6 (Kentucky)
(Battle ships)



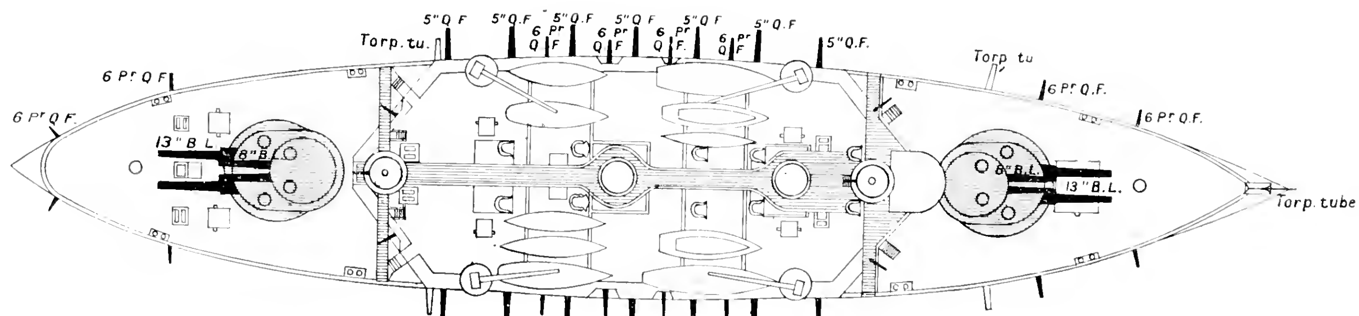
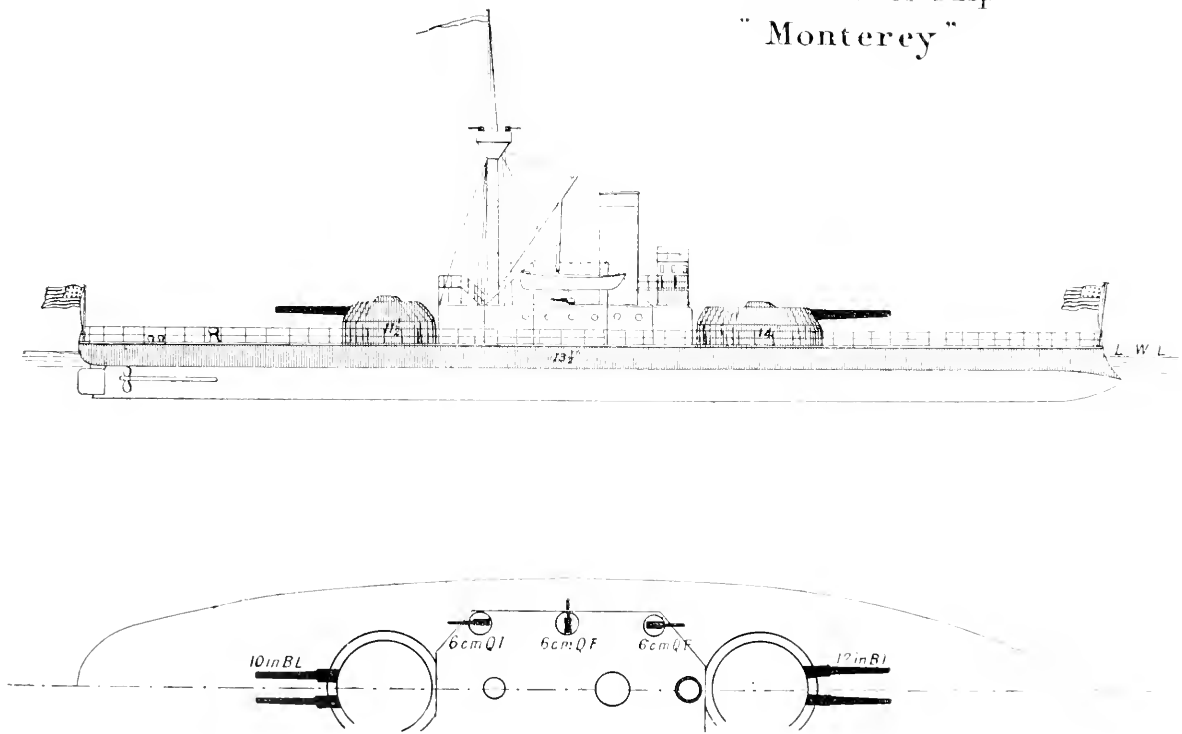
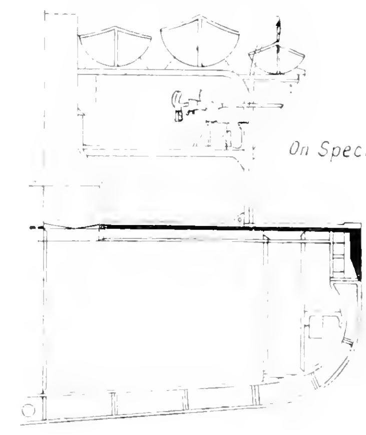


PLATE 82.

Coast Defence Ship
" Monterey "



Midship Section.



On Special Scale

PLATE 83.

UNITED STATES.

BATTLE SHIPS.

"Oregon"
"Massachusets"
"Indiana"

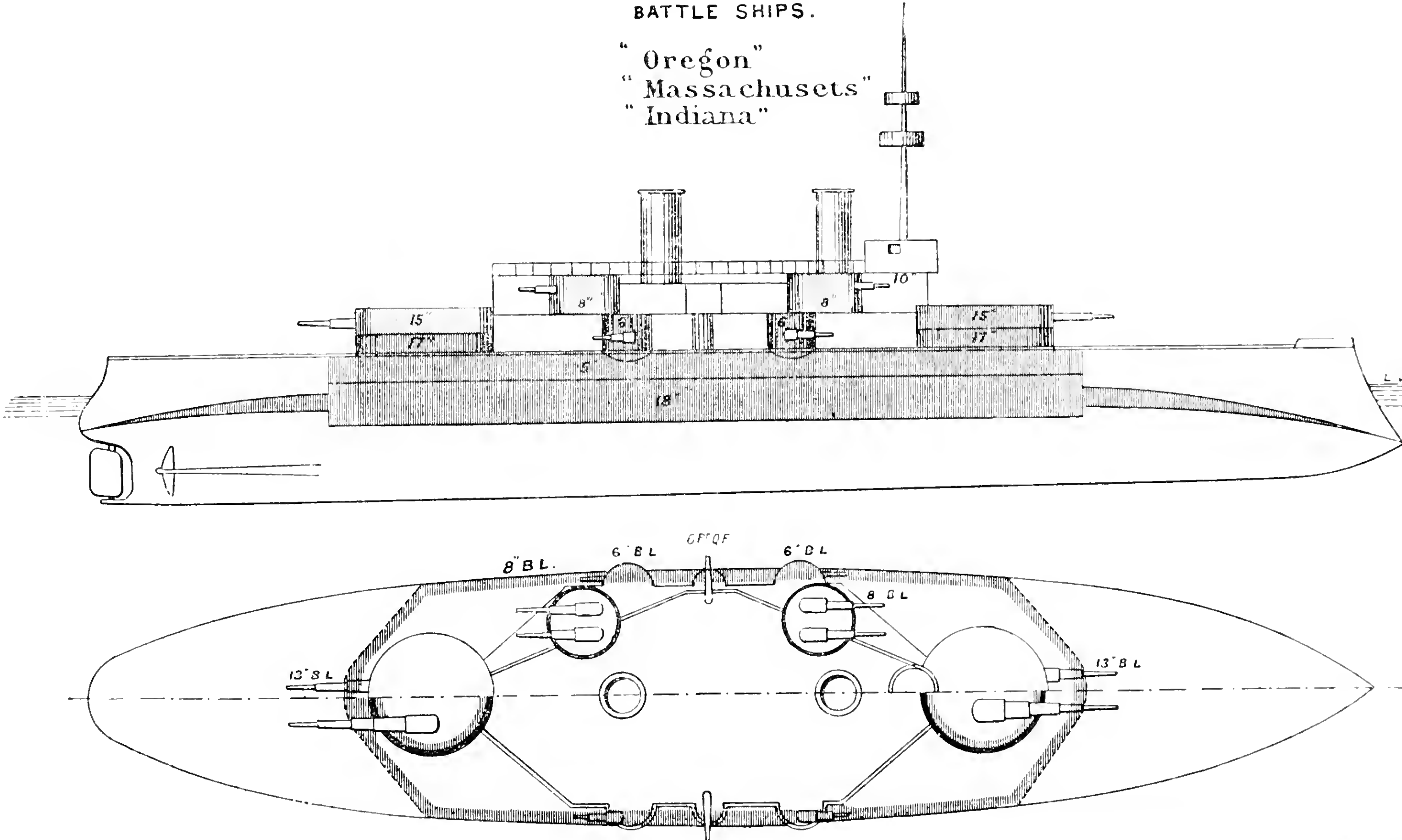
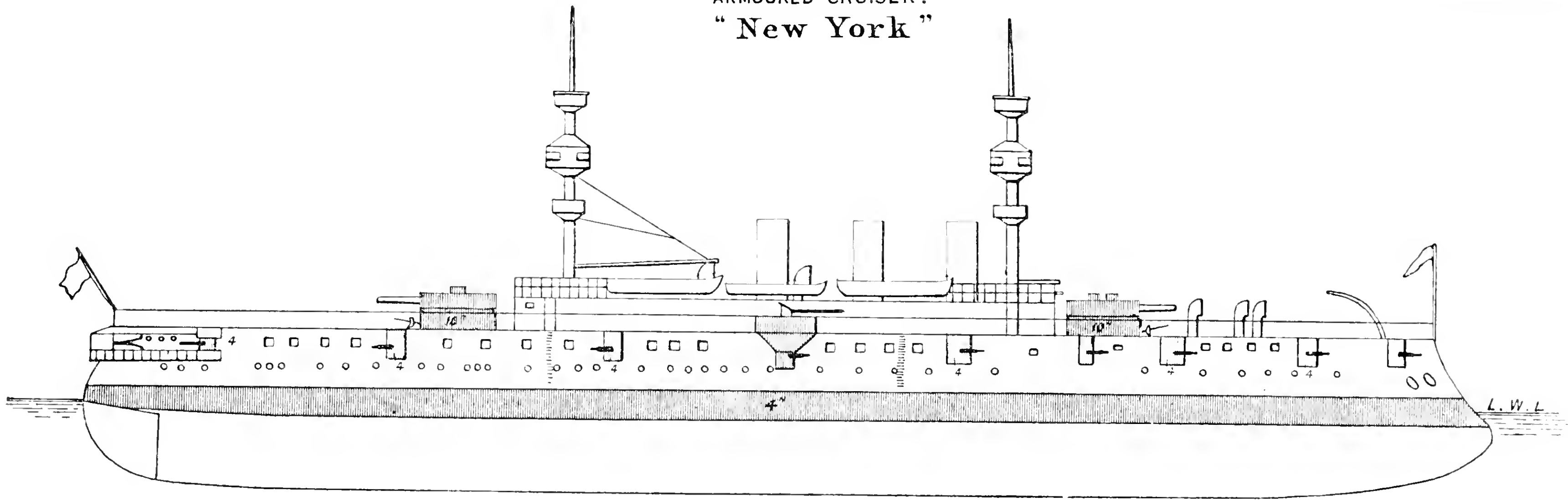


Plate 84.

UNITED STATES.

ARMOURED CRUISER.

"New York"



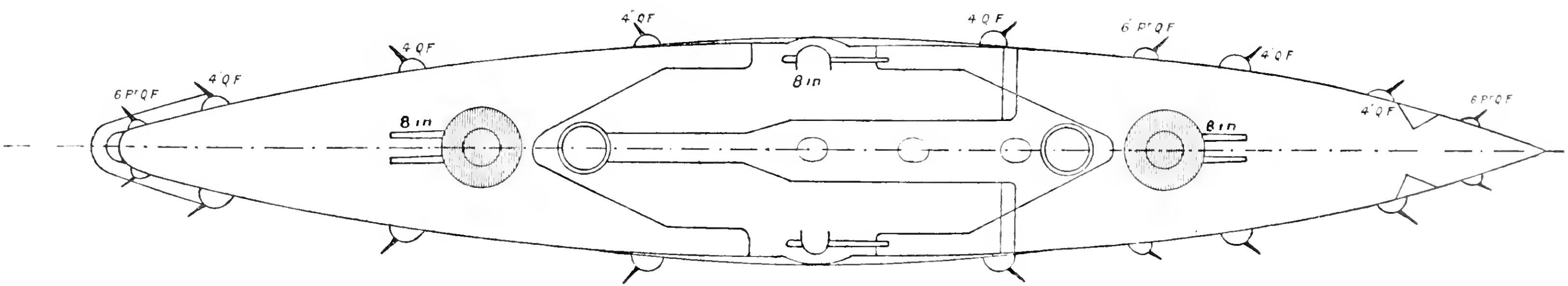
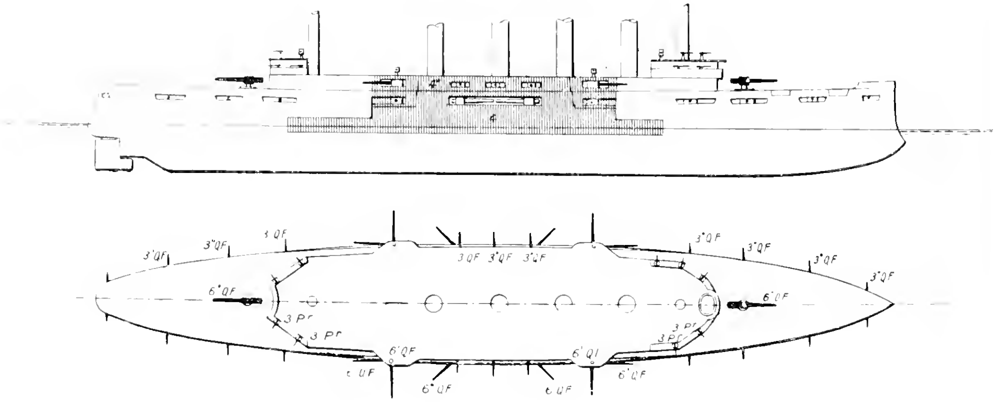


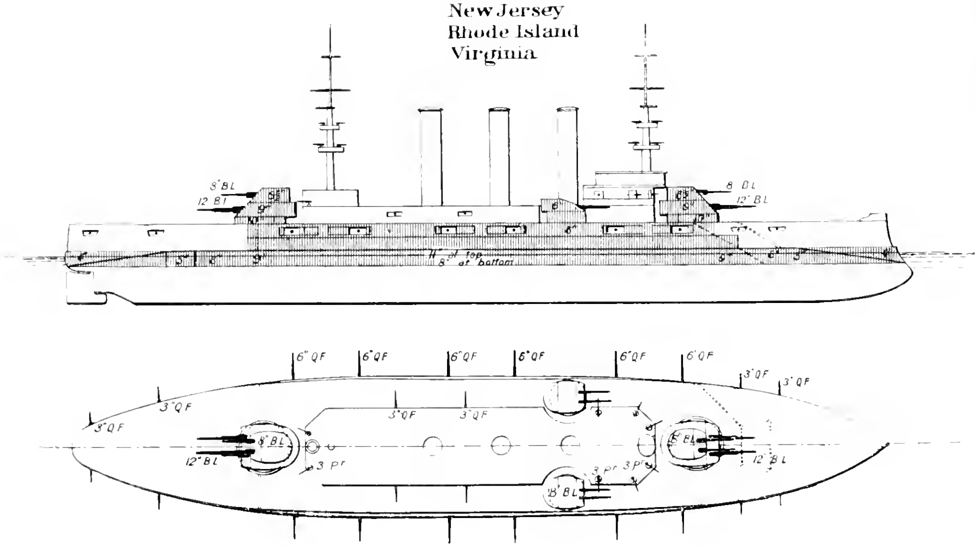
PLATE 85.

UNITED STATES.

Charleston.
Milwaukee
St Louis

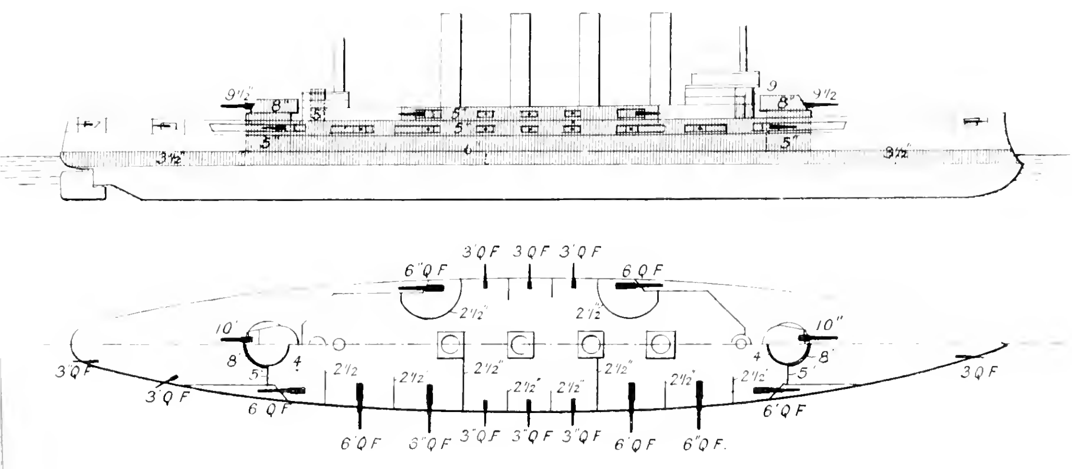


Georgia
Nebraska
New Jersey
Rhode Island
Virginia

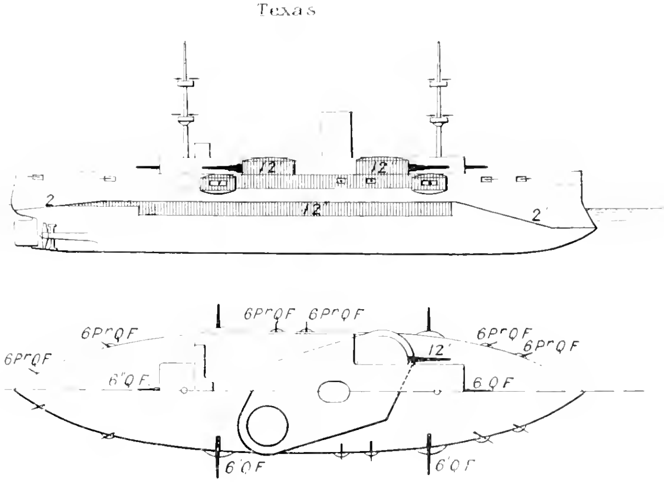


UNITED STATES.

Design for
New Armoured Cruisers



Texas

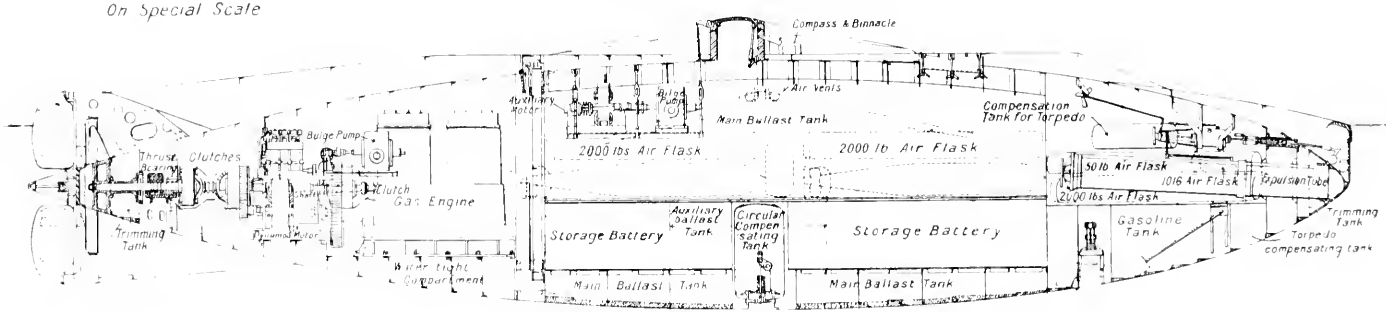


UNITED STATES.

SUBMARINE TORPEDO BOAT.

Adder. Moccasin. Porpoise
Grampus. Pike. Shark.

On Special Scale



PART III.

ARMOUR AND ORDNANCE.

PART III.

Armour and Ordnance.

INTRODUCTORY.

In the days of old, before the advent of iron and steel, the gun reigned supreme as the seaman's weapon. But when iron superseded wood, and steam took the place of sail, there appeared two formidable rivals of the gun—namely, the ram and torpedo. They still remain with us, and though the former has been so much discredited of late that some battleships are being built without rams, the torpedo is likely to be an important item in a ship's armament for some time to come. But the gun is rapidly eclipsing its two rivals, and ships are being built more and more with the idea of attacking with the gun and of successfully resisting a gun attack.

The function of the gun is essentially to attack with shell, and the armour plate was introduced mainly to keep out the shells, and, secondly, to render the ship invulnerable to shot as well as shells. A plate which is penetrable by shot may still be of great value in keeping out shells, so that it is rash to assume that a plate is useless because it is not absolutely invulnerable to non-explosive projectiles. The plate, indeed, is useful protectively, from the mere fact that the existence of armour causes the gunmaker to use a gun of small bore, which, though formidable for piercing plates, is not an ideal shell gun. There have been no marked changes in the year under review, but there has been steady advance in the same directions that have characterised recent years. The gunner's object, whether afloat or ashore, is to make as many effective hits as possible in the shortest time, and to so safeguard his gun by the use of armour that he can count on its remaining in action notwithstanding all the efforts of the enemy. In order that hits may be effective, guns must have good armour-piercing power, and rapidity of loading and aiming is essential; good shell power is desirable. Armour of the highest resisting power must be employed, and, above all, the highest skill is desirable in the laying of the gun and control of fire.

At the close of this part of the *Annual* a series of tables are

given, showing the existing guns of the various maritime nations. A glance at these tables will show the remarkable way in which the power of the gun has developed in the last few years. But a long period must always elapse before the whole of the weapons in the service of a great country can be remodelled. Again, although much has been said about changing the armour of a ship, there is no single instance in which it has been found practicable to remove the old armour and completely replate an old ship. Thus, although the latest developments of naval ordnance are mainly dealt with in the following chapters, it must not be supposed that these will be in common use afloat for some time to come. The navies of the present day are armed with weapons and provided with armour dating some years back; it is only the ships still incomplete that will reap all the benefit of present-day knowledge and progress.

CHAPTER I.

ARMOUR.

NEVER before could it be said that 100 armoured vessels were under construction at the same time, and this not in the whole world, but merely in the yards of five nations. Yet such is the case at present, and no higher testimony could be borne to the universally high estimation in which armour is held. The building of unarmoured ships of over 2000 tons has almost come to an end, and yet it is not ten years since that the unarmoured cruiser of 3000 to 4000 tons was being built in greater numbers than any other type of ship. One great reason for the increased popularity of armour is the improvement in its resisting power which makes a 6-in. plate of the present day equal to a 12-in. plate of a dozen years ago. Another and most potent reason is the discovery that the up-to-date big ship of 16,000 tons or more is very easily worked and handled. As a matter of fact, the Formidable, with her 16,000 tons displacement (loaded), is much handier than the 12,000-ton Nile, and she in turn is more easily handled than the 10,000-ton Colossus.

Wide-spread adoption of armour.

When the Alexandra, which for long ranked as one of our best ships, was built, 25 years ago, the thickness of armour plates was much what it is now, from 6 in. to 12 in. The calibre of guns was also about the same—say, from 7 in. to 12 in., the gun and armour plate being fairly well matched. Measured by its calibre, the piercing power of the gun has gone up more than twofold since then. The best 12·5-in. gun in 1875 pierced some 18 in. of iron, as against 46 in. for the up-to-date 12-in. B.L. If we take the weight of the guns as a basis of comparison, the advance is not so great, but still it is most marked, for the modern 10-in. gun of about the same weight as the old 12·5-in. has a piercing power of some 40 in., as compared with 18 in.

Thickness of plating has been reduced to what it was 25 years ago.

But the improvement in armour has somewhat more than kept pace with the increase of the power of the gun. The change from wrought iron to Krupp steel enhances the value of a 12-in. plate in the proportion of 10 to 23, whilst the improvement in guns of equal weight may be put at 10 to 22. It is, however, mainly the discovery of the big ship that has enabled us to go ahead. The improvements in guns and armour have so nearly balanced each other that, but for the naval architects, and especially the greatest genius of them all,

Improvement in armour slightly greater than the improvement in gunpower.

Sir William White, whose retirement from active service we are mourning this year, we should not have advanced at the rapid rate that we have done.

Water-line protection.

During the year under review there has been no great advance in the manufacture of armour, and it is therefore not inopportune, in the pause which has resulted in the path of progress, to consider the disposition of armour as applied to the ship of the present day. First, it is desirable to go into the question of the protection to the ship's flotation, which is sometimes loosely styled the armouring of the vitals. Armour is, in the main, a product of war. It took its rise in the Crimean War, and was thoroughly established by the war experience gained in the great American struggle of the early "sixties." But it was not the so-called vitals of the ship that called aloud for protection in these wars, but rather the guns and the men that fought them. Nor has any subsequent war experience justified the idea that the protection of the water-line is of greater and more vital importance than the safeguarding of the offensive weapons and the men manning them. The Spanish ships off Santiago would gladly have exchanged some of the water-line protection to save their men from the shells which cut them to pieces, and such lessons as can be deduced from the confused and confusing struggle off the Yalu tend in the same direction. Still, if not of the highest vital importance which some assign to it, the protection of the water-line must be carefully attended to, and all nations are in agreement as to this point. But there are still wide differences of opinion as to the best manner of applying the protection.

Disposition of water-line protection.

The two rival systems which attract most imitators may, for convenience sake, be designated the British and French types of protection, since Great Britain has been the main exponent of one, and France of the other. When sea-going armoured ships were first built, the armour simply consisted of a series of plates attached to the ship's side giving protection to the guns, whilst the lower edges of the plates extended below the water-line, partly to preserve the ship from the effect of hits between wind and water, and partly to protect the engines and boilers.

The system of 1875.

As the thickness of armour increased, it was found necessary to reduce the area of the protected side—thus the ends of the ship were left unarmoured except for a narrow belt at the water-line. This naturally left the portion above the belt open to the attack of shells, and, to prevent the water which would pass through these shell holes from going below, an armoured deck was provided. This was placed in line with the upper edge of the narrow belt, at from one to four feet above the water-line.

So far all nations had been in agreement, but when it became a question of further reducing the armoured area in order to still further augment its thickness, considerable difference of opinion was manifest. On the one hand, the French, following the precedent of the American monitors, put their trust in a narrow but complete belt with armoured deck covering it in, whilst the British constructors had a short, broad piece of belt forming an armoured citadel which occupied the central part of the ship, whilst that portion of the ship before and abaft the citadel was not belted, but was protected by an armoured deck sunk below the water-line. Against the French plan it was urged that the top of the belt was so low that a large volume of water would, as the ship rolled, be scooped up through shell holes in the thin side and would swamp and finally capsize the ship; whilst against the British plan it was urged that, the unbelted ends being riddled, the ship would sink or capsize from the weight of water shipped forward and aft of the citadel. The British plan had the advantage of affording continuous armour protection to the lower portions of turrets and to the ammunition supply generally, which, in the French ships, was dependent on armoured tubes. It also lent itself more readily to the protection of the secondary armament. On the other hand, the advocates of the French system declared that their belt was high enough to guarantee the flotation, and that the guns in barbettes or turrets, with armoured ammunition tubes, were fully and amply safeguarded. There can be no doubt, however, that both systems are open to the objection that large and possibly dangerous masses of water are likely to find their way into the ship.

Latest system more or less a reversion to ancient types.

As the resisting power of armour has increased, owing to the substitution of steel for wrought iron and the discovery of the Harvey, Krupp, and other methods of treatment, the armour has again spread over the ship, and the British and French types are once more losing some of their special characteristics, both nations having adopted parts of each other's systems. In the latest British ships the belt now extends nearly the whole length of the water-line, whilst the French, on their side, have adopted the British arrangement of the upper belt, or citadel, which carries the armour well above the water. Faithful, however, to the original plan, the French do not limit the length of the upper belt, but continue it from end to end, whilst aft, at any rate, the British armour does not run to the stern, but takes a short cut across the ship in the form of a bulkhead with only a low 3-in. belt reinforcing the armour deck.

Development of the armoured deck.

Recent years have witnessed great developments of deck protection. The Warrior had no armoured deck, whilst the larger protected cruisers, which carry a much greater weight of armour than did the

Warrior, have little protection save the deck. The object of the armour deck is to prevent projectiles, whether shot or shell, from passing downwards below the water-line, where injury might be done to engines, boilers, or magazines, whilst water would also find its way below in the wake of a heavy projectile. But for the deck a shot or shell might well turn downwards and pass through the bottom. In unarmoured ships the armoured deck is always placed with its edges somewhat below the water-line, and with the centre about in line with the water. This has been universally adopted for the cruisers of all nations, the sloped part of the deck towards the edges being thicker than the flat part.

Armoured and unarmoured cruisers.

When the resisting power of armour of 4 in. thickness and over was so greatly improved by the Harvey and Krupp processes, but little advantage accrued to the thinner deck armour, hence the British system of putting all the weight available for armouring a cruiser into the protective deck has very rightly been discredited. A portion of the weight can now be far more economically applied in the form of vertical armour on the ship's side. But there is a great deal of misconception and loose talk on the subject of "armoured" and "unarmoured" cruisers. Thus the armoured cruisers of the Orlando class, which have a narrow belt extending from 1 ft. above the water-line to $4\frac{1}{2}$ ft. below it, are not nearly so well protected against the enemy's fire as the "unarmoured" Diadems. In both ships all projectiles from guns under 7 in. which strike near the water-line will be stopped either by the belt or the slope of the deck. But in the Orlando the flat part of the deck is thinner and more vulnerable than that of the Diadems. In both ships a shell that strikes just above the water-line will tear a large hole and cause water to flow on to the armoured deck, and thus impair the stability and speed; whilst in the Orlando it is true that those shells that strike the belt itself will burst outside and do no harm, but these will be very few in number, seeing that most of the belt is below water. Thus in the "armoured" ship there will be slightly fewer holes admitting water; whilst in the "unarmoured" one there will be fewer holes in the deck, and therefore less chance of the water finding its way below through a hole in the deck. On the whole an armoured ship with the belt so nearly submerged that the water flows over it with the least roll is in exactly the same position with regard to water-line protection as the ship with protective deck only. There is, however, this to say in favour of the belted ship—the projectiles that are incapable of piercing the armour will glance off harmlessly, whilst those that strike the slope of the deck of a protected ship will go upwards into the ship, possibly passing through the various decks and doing

considerable damage. It is above water that the Diadem has such an advantage over the Orlando, for 12 of her guns are protected by 6 in. of armour, whilst all the guns of the latter are entirely unprotected except by shields.

The modern armoured ship.

But all the armoured ships now building, whether battleships or cruisers, have belts that extend to a considerable height above the water, and this renders these ships much safer against the ingress of water than the older type. As a rule, the belt is in two distinct strakes, the thicker lower strake being topped by the armoured deck. Thus the upper strake prevents the entry of water above the deck, and also protects the latter from direct impact, whilst the thicker strake prevents penetration at the water-line.

In British ships, however, both battleships and cruisers, the belt, in lieu of being divided by the deck, is continuous and is usually of uniform thickness, whilst in foreign ships the rule is that the portion of the belt below the deck is much thicker than that above it. The deck in British ships slopes sharply down so as to meet the lower edge of the belt. In foreign ships, save the very latest, the deck is usually nearly flat. Thus in a British ship a shot cannot reach the engine-room or stokehold without first piercing the belt, which will almost certainly break it up, and the fragments then have the task before them of penetrating the armour deck; whilst in a foreign ship once the belt is penetrated the fragments have only to traverse the coal bunkers before reaching the engines or boilers. The resistance of the belt and deck taken together is, as a rule, fully equal to, if not greater than the foreign thick belt. A shot striking 3 ft. or 4 ft. above water in a British ship will encounter a thicker plate than that to be found in foreign ships, and is therefore much more likely to be stopped outside the ship. Still, the upper belt in foreign battleships is usually thick enough to keep out the projectiles from Q.F. guns, and the thicker British belt is easily penetrable by the heavy guns of a battleship, such as the 12-in. It is therefore open to question whether the heavy upper belt of the King Edward class, which is 8 in. in thickness, might not advantageously be reduced. It is, however, a notable fact that the French in the République, and the Russians in the Borodino, have adopted what is substantially the British plan. The Germans and Americans, however, adhere to the thinner upper belt, but in the latest American armoured cruisers the British plan is followed. The Maine class of battleship, now building in the United States, also has the sloping deck reinforcing the belt.

The upper armoured deck.

In the latest British, French, and Russian battleships there is also an armoured main deck covering in the top of the upper belt. In the King Edward class, owing to the ship's side between the upper

and main deck being completely armoured, so as to form a battery, this armour is put on the upper deck, where it is 1 in. thick. The weight of this armoured deck so high above the water scarcely seems justified. Overhead protection for the main-deck guns might be arranged for a less weight. The upper deck should be as clear as possible, so as not to burst shells there, then mere patches over the guns would suffice.

Resistance of the armour protecting engines and boilers.

In the typical ships whose protection is given below, the British plan has been universally adopted for protecting engines and boilers, the deck being sloped down to the lower edge of the belt.

PROTECTION TO ENGINES AND BOILERS.

FIRST-CLASS BATTLESHIPS.	Belt.	Deck.	Coal Bunker.	Total Protection Equivalent in Wrought Iron.
	Inches.	Inches.		Inches.
King Edward Class . .	9 K.S.	2 sloping.	Yes.	30
République	11 to 8 "Special"	$2\frac{3}{4}$,,	,,	35 to 29
Borodino	10 to 8 K.S.	$1\frac{1}{2}$,,	,,	31 to 27
Wittelsbach	9 K.S.	$2\frac{1}{2}$,,	,,	31
Georgia	11 to 8 K.S.	3 ,,	,,	35 to 29

It will be seen that a shot with piercing power of 35 in. wrought iron will penetrate the best protected ship, whilst one with 32 in. will have a fair chance. The penetrative powers of heavy guns are as follows :—

		1000 yds.	2000 yds.	3000 yds.	
				Direct.	30° to Normal.
British . . . . . . / French . . . . . . / Russian . . . . . . / American	12-in. V.= 2500 f.s.*	36	32	29	23
12-in. V.=2800 f.s.*		43	39	35	27

The existing 12-in. guns, with about 2500 f.s. (850 lb. shot), are only effective if a shot strikes direct at 2000 yards. But if the velocity claimed for the new American 12-in. B.L. be realised on service, the gun will be in the ascendency up to 3000 yards, and the resistance at the water-line will have to be increased. This must be

* For 850-lb. shot.

done either by increasing the thickness of the belt or sloping deck. This latter is decidedly the preferable course. But the above ships are yet in the future—none of them will be ready until 1903 at the earliest—and more than half the existing first-class battleships, including the eight Royal Sovereigns, six Canopus, six Duncans, nine French ships,* seven Russians,† and five Germans (Kaiser class), have a resistance to penetration at the water-line not exceeding some 26 in. of wrought iron. So that the existing 12-in. guns are more than a match for these ships at what may be considered the ordinary fighting range of 3000 yards. Moreover, the introduction of a better firing charge than that now in use may increase the power of the gun, but the armour can never be increased in thickness. So that the piercing of the water-line may be looked upon as a not unlikely occurrence in the next fight between battleships.

Armour for protecting the guns.

In the case of the armour protecting the guns, the resisting power of that applied to the heavy guns differs very greatly from that protecting the secondary armament. All nations now agree in placing the heavy guns in turrets or hooded barbettes, the endeavour being to protect the guns against even armour-piercing shot from similar guns. But this ideal is not attained by any nation. From 25 in. to 28 in. wrought iron represents the average resistance to penetration of the most recent ships' turrets and barbettes, and this is not sufficient in view of the fact that with velocity 2500 f.s., the 12-in. gun penetrates 29 in. at 3000 yards, and as much as 35 in. when, as in the latest guns, the velocity rises to 2800 f.s. So that the armouring of barbettes and turrets seems likely to increase in thickness once more. Whether any weight can be saved by making the barbette smaller seems an open question. There scarcely seems sufficient reason for building the barbette tower as a cylinder right up from the armoured deck. A much smaller space than that usually provided should suffice for the handling of ammunition; the turning gear can be placed beneath the armour deck; and we look forward with confidence to improvements in this direction which will enable the armour to be thickened without greatly increasing the total weight. There has been very marked advance in this direction in the barbettes for the 9·2-in. guns, one of which was illustrated in last year's *Annual*, and it will be most interesting to observe what the Americans will accomplish in this direction in their new designs of ships, especially in the armoured cruisers, where saving of weight is of the greatest importance.

* Gaulois, St. Louis, Charlemagne, Massena, Carnot, Jauréguiberry, Charles Martel, Brennus.

† Potemkine, Retvizan, Peresviet, Oslabya Pobieda, Three Saints, Rostislaf.

Protection for the secondary armament.

It is scarcely fifteen years ago that protection for the secondary armament was inaugurated by fitting box batteries for the 4·7-in. guns of the British ships Nile and Trafalgar, but this precedent was immediately abandoned and the casemate system was introduced in Great Britain with the passing of the Naval Defence Act of 1889. At present we have no less than 860 casemates, and though there are signs that the days of the casemate are numbered, all but two of the 35 armoured ships building for us at the present time are so fitted, and there are in the 33 ships in question no less than 380 casemates, a greater number than there are in the whole world besides. For though there is no nation that has not to some extent dabbled in casemates, none has taken them up heartily. When they have been adopted for a time, they have very shortly been abandoned, or when used, as in the German battleships, in combination with turrets and box batteries, the turret is generally preferred, unless the position chosen for a gun is such that the casemate system is the only one possible. The only nation outside Great Britain that has taken up the casemate warmly is Japan, and the reason is not far to seek—most of her ships are from British designs and have been built in England.

The following gives an idea of the method of mounting and protecting the secondary armament in battleships, and the Q.F. armament of cruisers:—

PROTECTION OF SECONDARY ARMAMENT.

SHIPS BUILT AND BUILDING.

	Guns in Casemates.	Guns in Turrets.	Guns in Box Batteries.	Total.
British	860	32	32	924
French	140	268	26	434
United States	12	108	280	400
Russia	66	112	58	236
Germany	84	76	96	256

France stands out as the champion of turrets, and the United States of box batteries. All nations, save Great Britain, have gone in largely for turrets, but till very lately we have had nothing but casemates. But in the latest British ships, the battleships of the King Edward class, the box battery with superposed turrets is introduced and the casemate disappears. This is a great change for

a British ship; it means that we have substantially adopted the American plan; moreover, this plan is now being followed by well nigh all the European nations. The casemate doubtless has some good points, and we shall have to do our best with the 860 guns thus protected; but it is as well to frankly acknowledge its defects.

Defects of casemates.

When the casemate was introduced ships were extremely open to the attack of common shell, and it was mainly with the view of meeting shell attack that this kind of protection was designed. The thick front plate was expected to stop all shells striking direct, whilst the thin side and back plates were considered sufficient to stop the fragments of shell that entered the ship in the neighbourhood of the gun to be protected, and burst after passing through the ship's side. It was also hoped that about half the armour-piercing projectiles aimed at a row of casemates would traverse the open spaces between them without doing any harm, whilst in the case of a continuous box battery there would be hardly any misses, right or left. But it is most fallacious to suppose that armour-piercing shot or shell striking the ship's side between two casemates will do no harm. Only if fired from exactly abeam will they pass out without doing damage. If the enemy is some 20° before or abaft the beam, every shot that passes between two casemates will strike and easily pierce the back of a casemate on the disengaged side, and do far more damage than if the guns were in a box battery. Again, if the enemy's bearing be some 50° or 60° from the beam, the projectiles passing between the casemates will pierce the thin side plates of the casemates on the fighting side, so that a shot quite incapable of piercing the front plate will thus find an easy entrance. The casemates most exposed to this kind of attack are those on the upper deck, which are a long distance apart. Moreover, on the upper deck a casemate is most unsatisfactory. The upper deck guns should be capable of use both as broadside and chase guns; that is, they should fire at least 40°, and if possible 45°, before or abaft the beam, and at least 5° across the line of keel. This entails an arc of training of 140°, which is more than can be obtained from a casemate. The effect of employing a casemate is that the training extends from barely ahead to some 25° abaft; the gun is neither a good chase gun nor a good broadside gun, and is much exposed to disablement through the weak sides and back of the casemate, or by a high explosive shell bursting in the large port.

Advantages of the turret.

The French, Russians, Italians, and Americans, with their secondary guns on the upper deck in turrets, get a great advantage over us as regards the wide arc of training which is essential for such guns. The training across the keel is probably better, and can certainly be made so if adequate arrangements are made for shielding the barbettes

from the blast of the secondary guns. The turret not only possesses the great advantage of thorough all-round protection against shot, which the casemate lacks, but the port being only about one-fifth the size of the casemate port, there is far greater security against the burst of a high explosive shell. Both in casemates and box batteries the large splayed embrasure ports, which measure about 9 ft. across, are ideal shell traps. A high explosive shell, bursting here, would send such a blast into the port as would knock out the gun's crew, at any rate for a time, and thus silence the gun.

Reputed slow rate of fire from turrets needs verification.

The drawback which is supposed to attach to turrets is that the loading and laying are slower. This may be the case, but firing at a reduced rate is better than not firing at all, and in a duel between turrets and casemates the rate of fire from the latter would soon fall below that of the former owing to the silencing of some of the casemate guns. In any case it is desirable to see what we can do with turrets; the slow rate of fire may not be a fact—it has never been verified in England.

Box battery preferable for the main deck.

Since turrets cannot be used on the main deck, and it is desirable to have some guns here, these must be in either a box battery or in casemates. The box battery is decidedly preferable, as it does not possess the weak points of the casemates in the thin backs and sides. Moreover, the guns can be isolated most efficiently by light bulkheads of not more than 1 in. in thickness. But these bulkheads must go completely round the guns, as otherwise a heavy shell, such as the 12-in., will disable the whole battery—not by its fragments, but by its blast. The Americans have an excellent 12-in. armour-piercing shell containing 65 lb. of a high explosive called Dunnite. Such a shell would utterly wreck the whole of a box battery which was not cut up by proper traverses into distinct compartments for each gun. Now that it is becoming the fashion to have an armoured deck roofing over the box battery, it is very necessary to provide good hatches in this deck to give an exit to the gases from armour-piercing shells which may burst inside the battery. This question has been very insufficiently considered in existing ships. Armour plates are lavishly provided to keep out the shells, but no care is taken to make such arrangements that when shells burst inside the ship, but outside the armour—as, for example, on the main deck abreast the barbette tower—they may do as little harm as possible. In the Majestic class shells bursting between the main deck casemates will either blow up the 12-pounders overhead or strike downwards behind the armour on to the flats. If suitable hatches had been made, the gases could be guided clear both of the 12-pounders and the flats.

It is the commonest possible thing to place round the conning tower large structures of ordinary plating which will catch and burst numbers of shells that would otherwise have passed harmlessly over the ship. If light temporary structures, which could be unshipped on preparing for action, were substituted for the present massive seaman's "heads," &c., there would be a great saving of weight and no sacrifice of comfort. Again, most modern conning towers have chart houses, &c., built over them, as if for the very purpose of making the conning towers untenable by bursting high explosive shells immediately over the captain's head. These also should be removable. Unnecessary top hamper.

None would imagine for a moment, on examining the upper works of a modern battleship, that they were built up with the knowledge that they would come under the fire of quick-firing guns using high explosive shells. In these days of ventilating fans, it cannot be necessary to have the numerous and massive air-shafts that rise in all directions. A beginning has been made in some of the newer cruisers, and we look with confidence to see the same improvements in all new ships. The question of the funnels in battleships and armoured cruisers is worthy of careful consideration. These ships are intended to stand such a hammering as the Belleisle received. But in less than three minutes after fire was opened at the part of the ship where the funnel was placed in the Belleisle, it was cut through and toppled over. In the firing at the Scorpion it is also said, in the meagre accounts that have appeared in the Press, that the funnel was knocked away, and it stands to reason that such a prominent object is sure to be much cut about. Viewed from the bow or quarter, the four funnels of the latest cruisers present a target some 50 ft. high and 40 ft. across. A high explosive shell bursting in the funnel may send a dangerous blast down into the stokehold. Moreover, if reliance be placed on the funnel for securing a draught for the fires, the loss of the funnel will make a serious difference to those responsible for keeping up steam. We consider it worthy of discussion whether the funnels could not be dispensed with in action. If made telescopic and lowered down, as was the custom when not in use in the early days of steam, there would be some additional protection to the uptake between decks, and the target for catching shells flying high would be very largely reduced. If a short funnel suffices in a small craft to convey the gaseous products of combustion clear of the deck and those there, it should also suffice in a big ship. Even with the funnel lowered down, the height from fire-bars to top of uptake will be considerable. It must be remembered, too, that in action in an armoured ship there Ventilators and funnels.

should be no one on deck. All that is necessary is to have the uptake a trifle higher than the conning tower and turret hoods. In the days of the American Civil War there were no high explosive shells, yet the monitors found it desirable to well nigh eliminate their funnels; and when ships once more hammer each other as they did then, it is absolutely certain that much of the top hamper above the upper deck will have to go, and the funnel will probably go with it.

Thickness of armour on secondary guns.

As pointed out last year, the armour protecting the secondary armament is more than a match for the guns which are likely to be brought against it. Six inches of Krupp steel is the least that is being applied for this purpose, and in the latest ships, such as the King Edward, Borodino, République, and the new American ships, $6\frac{1}{2}$ in. to 7 in. is being used. The Italians are even going to use 8 in.

Calibre of secondary guns.

In England, the increase of the size of the guns which must needs follow this increase in the thickness of armour, proceeds at a very slow rate. The $7\frac{1}{2}$-in. gun has been talked of for years. It figured in the *Annual* of two years ago as being under construction. Yet the Estimates announce that during the year ending April 1st, 1903, we shall have under manufacture—

24 12-in. guns.
12 9·2-in. guns.
10 7·5-in. guns, which will not be completed by April 1st, 1903.
248 6-in. guns.
605 smaller guns, including Maxims, &c.

We are spending our money largely on the already outclassed 6-in. gun, and even in a year's time we shall not have a single 7·5-in. gun afloat. In the recent Belleisle experiments the 6-in. gun was only pitted against a 4-in. plate, whilst the 9·2-in. was used against the 6-in. plating, presumably because the 6-in. gun was known to be useless. It is a mistake to continue to supply 6-in. guns by the hundred to battleships which will have nothing much thinner than 6-in. armour to fire at. The destruction of unarmoured parts can well be left to the light guns, of which such large numbers are to be found in all ships. Moreover, the older ships in the line of battle will of necessity contribute large numbers of 6-in. shells, of which more than enough will be poured on to the enemy. What we need is more penetrating projectiles.

British secondary armament compared with that of other nations.

It is true that, with the exception of the Americans, who have long used the 8-in. slow-firer, and the French, who have a powerful 6·5-in. Q.F. gun, other nations are not much ahead of us. But for many years we were well ahead of them in the possession of a

powerful secondary armament, itself well protected and capable of piercing the corresponding protection of foreign ships, and it is a great come-down to have to confess that we have lost our superiority and are distinctly dropping to the rear.

Summary and conclusion.

To summarise what has been said above, the armoured ship is more in evidence than ever. She will be protected at the water-line by a broad belt starting well below water, where it meets the edge of the sloping armour deck and extending several feet above the water. The thickness of the belt may possibly be increased, but it seems probable that the increased resistance required to withstand the improvements in guns will take the form of thickening the slope of the armour deck.

Above the belt an armoured box battery will occupy the midship part of the ship, and above this again, at the four corners of the battery, will be the principal secondary guns in turrets, the main armament being installed in double turrets or barbettes, as has now been for some time the case.

The same arrangement seems likely to be followed for cruisers as well as for battleships.

With the adoption of turrets and box batteries the casemate will disappear.

The thickening of the armour of the main barbettes is most necessary.

The increase of the calibre of the secondary guns of battleships and first-class cruisers is imperative; much of the top hamper encumbering the upper decks of armoured ships will have to go; also, possibly, the funnels will have to be lowered in action.

CHAPTER II.

Armour Plates and Projectiles.

Review of the year.

The year 1901 has not been notable as regards the manufacture of new types of armour. The Krupp process holds the field, and has been adopted by almost all nations, including England, America, Russia, Germany, Japan, Italy, in which latter country the Turni works have lately paid a composition to Krupp, whose system has also been imported into France. It has certainly been declared in that country that the French type plates were found to be greatly superior to those made in France by the Krupp process; but the fact remains that the Russians, when buying plates in France, absolutely insisted on the Krupp process being used. The Russians have wide opportunities of learning which process is the best—they have excellent steel works of their own, they deal largely in America and to the same extent with Germany, and their testimony to the value of the Krupp process is one that must carry weight with all thoughtful men.

The Krupp cemented process.

Resistance of plates over 9 in. and under 6 in.

The Krupp process ("K.C.") is at its best for plates from 6 in. to 9 in. in thickness. It is much to be desired that the high resistance of the plates of medium thickness should, as experience is gained, be extended to thicker and thinner ones. But this has not been the case. The $11\frac{1}{2}$-in. Carnegie plate, attacked by the 12-in. gun in competition with Gathmann, was barely up to the average of plates of this thickness tried some years ago, and although some half-dozen trials of plates under 6 in. have been recorded, none of them showed any specially high resisting powers. Nor have there been many trials of very special interest apart from those in connection with the Gathmann gun, which are given below. The fact is, when a process is thoroughly established, as is the case with the Krupp process at present, the trials are almost all reception trials of plates and projectiles. In the former the plate has usually some 20 per cent. higher resisting power than the shot has piercing capacity, so the latter is readily smashed up, whilst in the other case the projectile is altogether an overmatch for the plate, which it gets through easily.

The Krupp non-cemented process.

British projectiles are proved against Krupp non-cemented ("K.N.C.") plates, and the results of proof, unlike those of armour plates, are seldom published. It, however, appears that the K.N.C.

process does not give the uniformity claimed for it. Some plates give way easily enough, others are nearly as good as cemented plates. Again, one portion of a plate will not infrequently display higher resisting powers than another portion. An overmatched plate usually yields through a disc being punched at, but occasionally the hole made by the shot is scarcely bigger than the diameter of the projectile. These latter plates are decidedly superior for unbacked armour, such as that which protects a casemate; but, perversely enough, it is just the type of plate of which casemates are now being made in great numbers that allows great discs to be punched out. The main deduction to be drawn from these trials is that good projectiles are being made at Sheffield and Elswick, and that it is extremely difficult to secure uniformity in non-cemented plates.

No trials of casemates.

Extraordinary as it may seen, notwithstanding that we have over 800 casemates built and building, there is no record of any trial having taken place at the peculiarly curved front plate which is the most salient feature of this structure. Hundreds of rounds have been fired at flat 6-in. cemented plates, also great numbers, especially abroad, at curved plates intended for turrets. But whether or not, as some plate manufacturers think possible, the curved front plate of a casemate would break up badly under fire has never been determined by trial. And owing to the position of the gun-mounting in the port, the bending of a casemate plate by a non-piercing projectile might, by jamming the gun, be just as fatal as a shot with great penetrating power. It is probable that Krupp process plates, whether cemented or not, would resist better than the old-fashioned Harvey plates of which hundreds of our casemates are made. Still, that does not obviate the need of a trial. When it was announced that Krupp process plates were being built into the old Belleisle, it was confidently expected that the trial of a casemate would take place at last. But it seems to have been a mere test of flat or slightly curved plates suitable for a cruiser's belt, of which we have had many trials already, and the casemate is still an untested structure. For the moment the opportunity of getting really sound information as to how our 6-in. casemated guns will fare in action under the fire of shot, shell, and high explosives respectively may have passed; but it is impossible to believe that this state of things can long continue, and though we may not be able in next year's issue to describe the trial of one or more casemates, still, it is to be hoped that such a trial will have taken place, and the authorities be in possession of the important information which such a trial must afford.

(K.C.) v. non-cemented plates (K.N.C.).

It was somewhat of a surprise to hear that casemates of K.N.C. plates were being supplied to the Royal Sovereign class. We do not know of any K.N.C. plate that has shown a higher figure of merit than 2·4, whilst K.C. plates have gone as high as 2·9, and, speaking generally, the resistance of the cemented plates is 20 per cent. greater than that of non-cemented. In 1899 a 5-in. K.C. plate, made in America for the Retvizan, completely overmatched 5-in. shot with velocity 2090 f.s. and penetrating power 11·6 in. No 6-in. non-cemented plate would be likely to do better, and some not as well. Nor is there anything to show that K.N.C. plates will stand shell fire better than the cemented ones; so that until an actual trial of a casemate takes place and proves the efficiency of K.N.C. for this peculiarly shaped armour, we must assume that, if K.C. plates had been used instead of K.N.C., there would be a saving of weight of nearly 20 per cent.

Trials in 1901-1902.

We are much indebted to representatives of the various manufacturers who have given us much valuable information as regards trials, &c., especially to Mr. Meigs, of the Bethlehem Company, United States; to Mr. Hunsiker, of Carnegie's; as well as to the great British ordnance firms, Armstrong's, Vickers, Cammell, Brown, and Hadfield's.

Beardmore 6-in. plate.

One of the most interesting trials this year was that carried out on 11th October, 1901, at Messrs. Vickers's range, for the test of an experimental plate manufactured by Messrs. Beardmore, which, we understand, was treated by a special process of their own. The following rounds were fired with Elswick A.P. shot, weight 100 lb. (See Plate II., which gives a photograph of the plate after the sixth round.)

Round.	Striking velocity.	Striking energy.	Penetration.	By Tresidder's Formula. Penetration. Wrought iron.	By Tresidder's Formula. Figure of merit.	Remarks.
	f.s.	f.t.	inches.			
1	1996	2764	2 (about)	13·8	2·3	Projectile completely broken up. No cracks.
2	1996	2764	2 ,,	13·8	2·3	Ditto.
3	2049	2912	2 ,,	14·6	2·4	Ditto.
4	2177	3280	3 ,,	15·7	2·61	Ditto.
5	2261	3550	Just through	16·6	2·77	Projectile not much broken. Point just broke skin plate.

The plate was therefore a very good and uniform one, with the high figure of merit of 2·77. After the last round there was nothing more than a few surface cracks. At the back of the plate the bulges were very slight, with the exception of that caused by the last round.

Plate I.—Elswick A.P. Shot after passing through 6-inch Beardmore Plate.
V. = 1945 f.s. Shot was fitted with Johnson cap.

Trial of Johnson cap.

A sixth round was fired at this plate, on 19th December, 1901, for the trial of the Johnson cap.

Round.	Weight of projectile.	Striking velocity.	Striking energy.	Penetration.	By Tresidder's Formula.		Remarks.
					Penetration. Wrought iron.	Figure of merit.	
	lb.	f.s.	f.t.				
6	105·9	1945	2778	Through	13·8	2·3	Projectile whole and practically uninjured.

The projectile made a clean hole, passed through backing and skin, and buried itself in the sand-butt. It was quite cool when found in the sand immediately afterwards. This shot had evidently something in hand—the cap increased the penetrating power somewhat more than 20 per cent. As we pointed out last year, this addition to the penetrative power would be very valuable where a gun was almost overmatched. Thus with the 6-in. gun and 2800 f.s. M.V., a 6-in. Krupp plate could be pierced if hit direct or nearly so at 2500 yards, whilst a 5-in. plate could be perforated at nearly 4000 yards. A cap would not make the best 6-in. gun efficient on service against 6-in. plates, for there is not sufficient margin of power; but it would make it capable of dealing effectively with a ship such as many of the recent armoured cruisers, where the 5-in. plating is much used. This plating would be riddled at 2500—4000 yards by all hits within 20° of normal, and though inside 2500 yards an uncapped projectile might suffice, even at these short ranges the direct hits from the capped projectile would come through with greater energy and do more harm inside than their uncapped rivals.

Trials of plates for Russian battleship Alexander III.

The following trials are worthy of record:—

(1) As showing the test to which plates for the Russian Government are subjected.

(2) As showing the high excellence of the armour for the small turrets, unbacked and bent to shape.

(3) The assistance afforded by a cap.

BETHLEHEM PLATE. GUN USED, 10-IN. B.L.

10-in. plate for barbette for 12-in. guns.

Round.	Projectile weight.	Striking velocity.	Striking energy.	Penetration.	By Tresidder's Formula.	
					Penetration. Wrought iron.	Figure of merit.
	lb.	f.s.	f.t.	inches.		
1	500	1730	10,386	3	19·3	1·93
2	500	1722	10,290	3	19·2	1·92
3	500	1705	10,088	2½	18 9	1·89

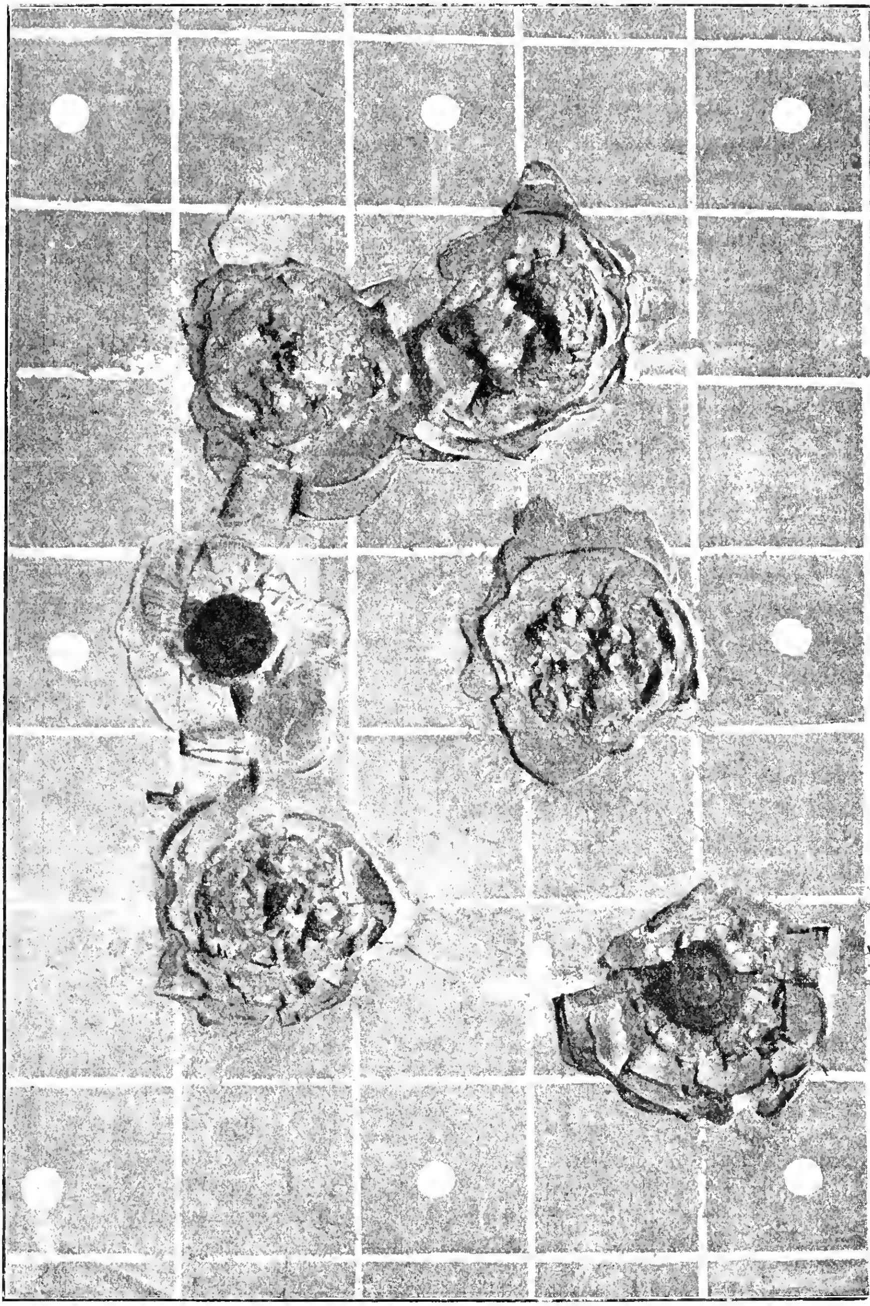


Plate II.—Beardmore 6-inch Plate which just stopped A.P. Shot, V. = 2261 f.s., but was pierced by shot with Johnson cap, V. = 1945 f.s.

The projectiles were smashed. There were no cracks. The plate evidently had a good deal in hand. The test is somewhat easier than the British test for similar plates.

CARNEGIE PLATE. GUN USED, 6-IN. B.L. (See Plates III. and IV.)

6-in. plate for turret for 6-in. guns.

Round.	Projectile weight.	Striking velocity.	Striking energy.	Penetration.	By Tresidder's Formula. Penetration. Wrought iron.	By Tresidder's Formula. Figure of merit.	Remarks.
	lb.	f.s.	f.t.	inches.			
1	100	1916	2544	1·75	12·9	2·15	Reception trial.
2	100	1930	2582	2·0	13·1	2·18	
3	100	1913	2536	1·38	12·9	2·15	
4	100	2290	3635	5·0	17·0	2·83	
5	100 with cap	1913	2536	5·0	12·9	2·15	

The plate was nearly, but not quite, perforated by the fourth round (see Plate III.) and fifth rounds (see Plate IV.). It had a very high figure of merit—viz., about 2·9 for uncapped projectiles, but only about 2·25 when opposed by a capped shot. The capped shot with 1913 f.s. was exactly equal to the uncapped one with 2290 f.s., and increased the penetrating power 25 per cent.

Resistance of a new battle-ship's armour.

The barbette armour of the Alexander III. would be easily pierced by the latest pattern 10-in. gun with uncapped projectile at 4500 yards range, where the striking velocity is 2050 f.s. On the other hand, the small turrets are proof against the latest pattern 6-in. gun with uncapped shot at 1500 yards, and can only be pierced by a capped shot at 2500 yards. Thus a 12-in. gun should make short work of the main barbettes, but the small turrets are practically proof against the 6-in.

What are principles governing the thickness of battleship armour?

It is not altogether easy to understand the principle on which armour is now being applied to battleships. When the Royal Sovereign was built the plan was a simple one. Six-inch plates were supplied to protect the 6-in. guns, whilst the heavy guns, being opposed by projectiles which at 1500 yards had from two-and-a-half to three times the piercing power of the 6-in. gun, had 17-in. plates. Similarly in the French Navy the ship of ten years ago had small turrets of 4-in. and large ones of 14-in. In the latest designs this proportion has been completely altered, so that in lieu of there being from two-and-a-half to three-and-a-half times as much protection for the big guns, they do not get anything like twice as much.

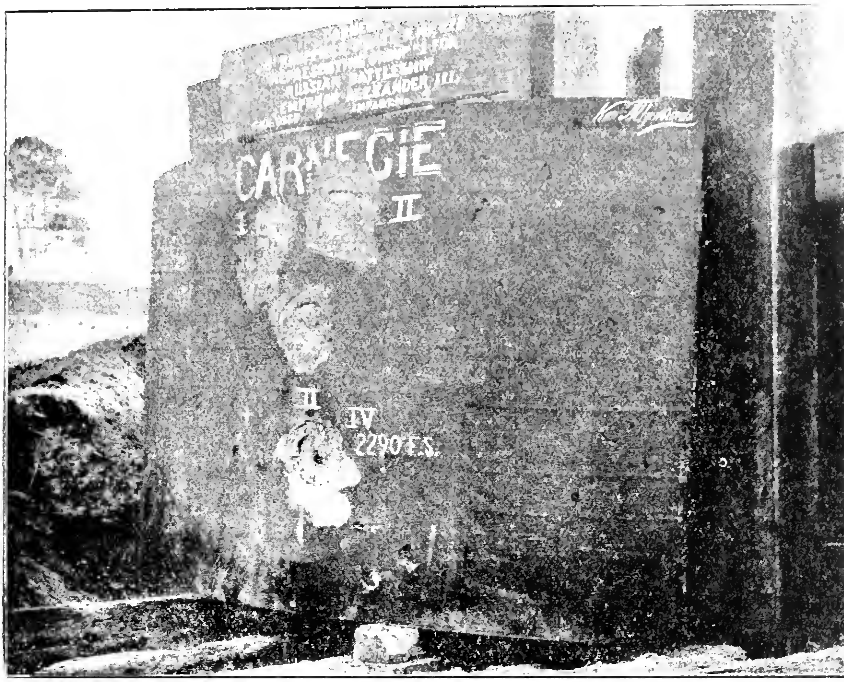


Plate III.—Carnegie Steel Company.

Ballistic Plate R N P. 278. Representing Kruppized Armour for Russian B.S. Emperor Alexander III., tested February 23rd, 1901, at Indian Head Proving Ground.
Gun used: 6″ B L R. Projectile: Wheeler 6″ A.P. uncapped, 100 lb.
Impact IV.: Striking velocity, 2290 f.s. Striking energy, 3635 ft.-tons. Penetration, 5″. No cracks in plate.

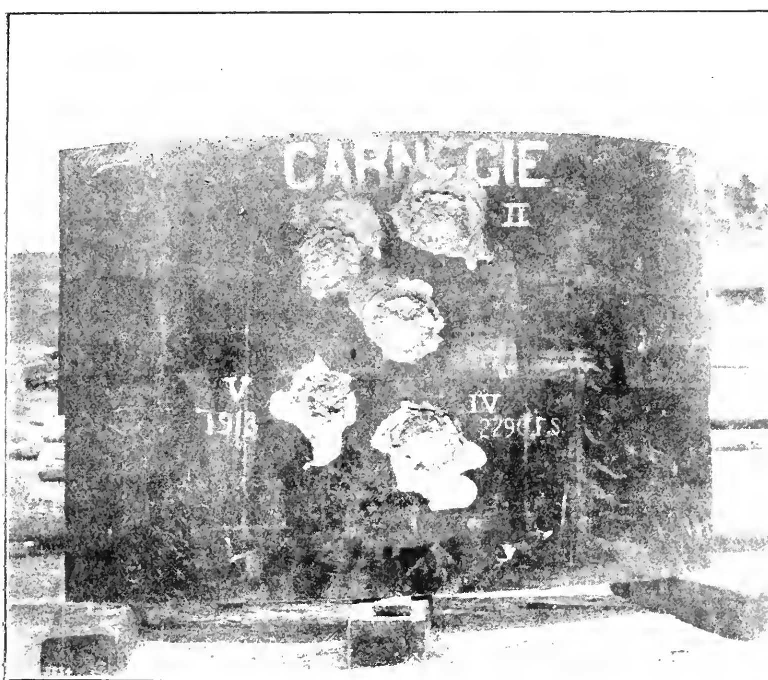


Plate IV.—Carnegie Steel Company.

Ballistic Plate R.N.P. 278. Representing Kruppized Armour for Russian B.S. Emperor Alexander III., tested February 23rd, 1901, at Indian Head Proving Ground.
Gun used: 6″ B L.R. Projectile: Wheeler 6″ A.P. capped, 100 lb.
Impact V.: Striking velocity, 1913 f.s. Striking energy, 2536 ft.-tons. Penetration, 5″. Several fine but unimportant surface cracks developed after the impact.

PROPORTIONAL RESISTANCE OF ARMOUR PROTECTING MAIN AND SECONDARY GUNS IN LATEST BATTLESHIPS.

	Protection. Secondary armament.		Protection. Main armament.	
	Actual thickness.	Equivalent in wrought iron.	Actual thickness.	Equivalent in wrought iron.
		inches.		
King Edward	7	18	12	28
République	6½ and 5½	17 and 14	11	26
Borodino	7	18	11	26
Wittelsbach	5½	14	10	24
Georgia	6	16	11	26
Mikasa	6	16	14	32
	(*a*) Average 16		(*b*) Average 26 (without Mikasa)	

Proportion of (*a*) to (*b*), 1 to 1·6.

PROPORTIONAL PIERCING POWER OF MAIN AND SECONDARY GUNS IN LATEST BATTLESHIPS, 3000 YARDS, USING NITRO-CELLULOSE POWDERS.

	Secondary armament. Piercing power, wrought iron, 3000 yards.	Main armament. Piercing power, wrought iron, 3000 yards.
King Edward	12 and 24*	35
République	14	35 ?
Borodino	12	35 ?
Wittelsbach	12	32
Georgia	12 and 20*	35
Mikasa	12	35
	(*a*) Average 12½ and 22	(*b*) Average 34½

Proportion of (*a*) to (*b*), 1 to 2·7.

Accordingly, except in the Mikasa, the big guns are now comparatively unprotected against their fellows, whilst the secondary guns fare extremely well. The only exception to the latter is when the secondary guns are attacked by the 9·2-in. of the King Edward or the 8-in. of the Georgia. Guns of this size will therefore be probably adopted in all new ships. The 7-in. and 7·5-in., with 17-in. and 18-in. penetration respectively, will also supersede the 6-in. Moreover, the reintroduction of, say, 15-in. barbette plates seems more than likely. There is no justification for the present fashion of denuding barbettes to favour other parts of the ship. It will probably be found possible to make barbettes smaller, which would allow some thickening of the armour without increasing the weight.

* Extra turret guns 9·2″ and 8″.

Though there is no sound reason for the reduction of the thickness of barbette armour, there is a plausible reason that may have carried weight with the authorities in various countries. The piercing power of guns is usually assessed at the muzzle. This would be most practical if ships were going to engage as in Nelson's day. But under existing conditions, where the torpedo prohibits an approach to 2000 yards, the system is absurd and most misleading, being grossly unfair to the heavy gun. At the muzzle the penetrating power of the 6-in. is half that of the 12-in.; but at 3000 yards the 6-in. has lost half its muzzle penetration, whilst the 12-in. has lost but a quarter. Thus at 3000 yards the 12-in. will pierce treble what the 6-in. does, instead of double. And yet the 12-in. has not sufficient armour allowed it as compared with the 6-in., even if the muzzle penetrations only be considered, so that under practical fighting conditions the big guns are now at a great disadvantage. These errors being common to all nations, the first Power that brings out improved designs will, by getting the start, reap a considerable advantage. It is to be hoped that this may be Great Britain rather than some foreign rival.

Reasons for reducing the protection of barbettes.

By the courtesy of Messrs. Vickers and the American firm of Carnegie, and Mr. Meigs, of the Bethlehem Company, we have been furnished with several reports of reception trials of plates. In every instance the plate much overmatched the projectile, so that the actual details are not worth reproduction. But it is not uninteresting to note that, taking Tresidder's formula as a basis, the tests in Great Britain are slightly severer than those in force in America:—

Reception tests of plates in America and Great Britain.

PENETRATIVE FACTOR, VIZ.:

Plate.	Piercing power against wrought iron. / Thickness of plate.
12″ American	1·85 to 1·9
11·5″ British	2·0
10″ Russian (U.S.)	1·9
9″ British	2·2
6″ Russian (U.S.)	2·15
6″ American	
6″ British	2·25
5″ Russian	2·2
4″ British	1·9

In view of the fact that large quantities of 4-in. plating are being supplied for the armoured cruisers of the Essex and Monmouth types, the low test for this class of plate is not very satisfactory. There seems no doubt that in the recent trials of the Belleisle the

4-in. plates were pierced by the 6-in. gun, and it is a question for consideration whether the new moderate-sized armoured cruisers should not have their plating thickened, even at the expense of reducing its area. Weight for weight, far more value is got out of a 5-in. plate than a 4-in., and there seems a strong case for, at any rate, giving the guns of the new Monmouths 5-in. or even 6-in. protection.

Caps for armour piercing.

In the above reports and comments it is always the uncapped projectile that is taken as a standard. But the cap has once more shown its usefulness for direct fire, and, as stated last year, this device may be relied on to greatly increase the penetration of all projectiles that strike within 20° of the normal. This is often minimised on the ground that in action all the hitting will be oblique. But such a statement will not bear examination. The case of firing at a circular turret or barbette was gone into last year, and it was shown that 34 per cent. of the rounds striking a turret will be within this angle, even if the shooting is so bad that there are as many hits near the edge, which is not aimed at, as near the centre, which is made the target. When the shooting is good, the grouping of rounds towards the centre of the target is very marked. Thus, in the Terrible's prize-firing for 1900, diagrams of which are given in last year's *Annual*, there are 41 hits on the centre strip of target, which is 8 ft. broad, and only 39 on the two sides, which together measure 12 ft. in breadth.

If this target had been a turret 20 ft. in diameter, 35 out of the 77 hits, or 45 per cent., would have been within 20° of the normal.

With average firing, 40 per cent. of the hits on a turret or barbette will be sufficiently direct to profit by the cap.

When the belt is the target, the proportion will be higher, for the following reason. There are the strongest tactical grounds for bringing a ship's broadside to bear—*i.e.*, that both barbettes should bear on the enemy. This means that the firing shall be for most ships within 30° of right abeam, and for only a very few as much as 40° or even 45° from the beam. When it is undesirable to get the object as much as 30° before or abaft, it is most necessary in practice to try not to exceed 20°, otherwise an unforeseen yaw may throw out of bearing half the heavy guns. It would be reasonable, therefore, to estimate that 50 per cent. of the hits on the side will be within 20° of the normal. And the conclusion is that nearly half the projectiles fired would profit greatly by the cap. Under these circumstances the adoption of the cap appears inevitable; indeed, outside Great Britain its use appears to be becoming general.

Pattern of cap.

The question of the attachment of the cap is an important one. The Johnson cap (see Plate I.) is attached by grinding a groove

near the point of the shot, whilst Messrs. Hadfield place a rib on the shot in about the same position. Hadfield's plan would be decidedly preferable if only new shot were in question. But it is most essential that existing shot should be capable of receiving the cap, in which case the Johnson groove would meet the case.

Supply of armour-piercing projectiles.

It is an open secret that the supply of ammunition in the South African War gave a great deal of anxiety. Owing mainly to the long ranges at which firing took place, the expenditure was enormous and unprecedented. There is every indication that in the next naval war similar conditions as regards range will prevail, for besides the great improvement in guns, which naturally leads to long-range firing, we have the fear of the gyroscopically-guided torpedo, which will keep ships from closing. It was not so many years ago that the great majority of our armour-piercing projectiles were bought in France, but this state of things has happily been ended by the establishment of the necessary plant for making and hardening armour-piercers by Firth, Hadfield, and the great Elswick firm. It is especially satisfactory to learn that Messrs. Hadfield have been very successful with cast steel shells. The manufacture of forged steel shells is a very tedious process, and if on an emergency arising there were a demand for large quantities of armour-piercing projectiles, we should very probably go short if we only had forged steel to rely on. The perfection of the cast steel manufacture by Hadfield, therefore, puts us in a better position naturally and is of no small importance. It has been stated in Parliament that the reserves of ammunition and projectiles, which were confessedly short last year, have been made up. Whether this includes a sufficiency of armour-piercing projectiles, to deal with the multitude of armoured ships now coming forward in all countries, seems open to doubt. At any rate, we could wish that our area of supply for these important stores was wider. Woolwich was always celebrated for its Palliser projectiles, but does little or nothing in steel armour-piercers. Armour-piercing shells are not fired in peace time, so that the peace demands are small, and the profit to the steel makers also small. However, we must hope that now that Elswick can supply such excellent shot as the 6-in. figured above (see Plate I.), which passed entire through a K.C. plate 1 cal. thick, and that Hadfield's cast steel are rivalling Firth's forged steel shot, which are of world-wide excellence, the supply may equal the demand, but we cannot ignore the fact that the demand will be a heavy one.

CHAPTER III.

The Attack of Armoured Ships.—Piercing and Non-piercing Projectiles.—Increased Velocities.

The Gathmann gun.

The contest between the small-bore gun, mainly depending on its penetrating powers, with the large-bore weapon, that trusts to smashing rather than piercing, is an old one.

In the days of the smooth-bore we had the long 32-pounder beside the short 8-in. shell gun; and, again, the 64-pounder shell gun competed with the 7-in. armour-piercing gun; but for some time the small-bore has held the field, to the almost total exclusion of the shell gun.

The shell gun has, however, been revived in heroic fashion in the United States by Mr. Gathmann, and, thanks to the liberality of Congress, has been granted a comparative trial, which has proved most interesting and instructive, and should settle the claims of the shell gun for some time to come. We mainly quote below the official report to Congress, but much of the information from America has been furnished by the celebrated Bethlehem Company, who built the gun for Mr. Gathmann.

Large bore *v.* small bore.

It has always been contended by the advocates of large bores that with a given weight of gun it was possible to obtain more energy from a large bore than from a smaller one. And there is no doubt that this is the case,* and that if it be the object of the gunmaker to obtain the highest possible muzzle energy with the smallest weight of gun, the present type of gun will not be found to altogether suit his purpose. But although high energy is desirable, there are other things that are more desirable. If the guns be large in bore, with short projectiles, the said projectiles lose much of their energy in flight, and on striking an armour-plate are found to be greatly inferior for piercing purposes to a somewhat lighter projectile of greater length fired from a gun of the same weight but of smaller bore.

And although the two guns may be of the same weight, the ammunition of the large-bore gun will be heavier than that of its small-bore rival, so that the total weights of gun and ammunition are not comparable in the two cases. But it is urged for the large-

* See, for example, the high energy obtained by the shell guns in Bethlehem Company's Table of Guns.

bore gun that it carries a much more formidable shell, as it undoubtedly can do. The gun is, in fact, essentially a shell gun, and when the principle is carried to an extreme, the howitzer is evolved. In the Gathmann gun the shell was so large, and contained such a large bursting charge, that its inventor dignified it with the title of "The Torpedo Gun." And this it deserves, if the weight of the bursting charge be taken into account. The largest 18-in. torpedoes carry a charge of less than 250 lb. wet gun-cotton, whilst the Gathmann shell has a burster of 500 lb. of that explosive. The particulars of the gun are as under. Those of the American 12-in. 40-cal. Navy gun are given for comparison.*

Gathmann gun compared with existing types of heavy guns

TABLE I.

	18-inch Gathmann Gun.	12-inch Army Gun.	12-inch Navy Gun.
Weight	60 tons.	51 tons.	52 tons.
Length total	44 feet.	37 feet.	42 feet.
Calibre	18 inches.	12 inches.	12 inches.
Length of bore	28 cals.	35 cals.	40 cals.
Travel of projectile	24·1 cals.	—	—
Charge	310 lb. Dupont smokeless.	270 lb. Dupont smokeless	360 lb. Dupont smokeless.
Shell weight	1840 lb.	1000 lb.	850 lb.
Weight of 80 rounds	77 tons.	45 tons.	43 tons.
Burster	507 lb. wet gun-cotton.	—	—
M.V.	1990 f.s.	2300 f.s.	2800 f.s.
Pressure in chamber	8·26 tons.	16 tons.	16·5 tons.
Muzzle energy	50,592 ft.-tons.	36,720 feet.	46,246 feet.
Penetration wrought iron—			
At muzzle	34·0 inches.	38·5 inches.	47·2 inches.
At 3000 yards	25·0 inches.	29·5 inches.	35 inches.

The Gathmann gun with 80 rounds of ammunition weighs 137 tons, the corresponding weight for the 12-in. is 95 tons, so that they cannot be compared as they stand. If a gun on the Gathmann principle were introduced in lieu of the 12-in., the weights of the Gathmann design would have to be cut down by 24 per cent. to bring them to an equality. This would give us a 16·5-in. gun of $45\frac{1}{2}$ tons, carrying a 1400 lb. shell with 385 lb. bursting charge. If shot were used in lieu of shell, the penetration at 3000 yards would be $22\frac{1}{2}$ in. wrought iron or $9\frac{1}{2}$ in. Krupp steel for the gun on Gathmann's principle, as against 35 in. wrought iron and 16 in. Krupp steel, the corresponding figures for the latest 12-in. gun.

* The gun tried against the Gathmann was the 35-cal. Army gun. But the 40-cal. Navy gun represents the latest pattern "small-bore."

But the 12-in. gun, if it went in for firing shells containing the largest possible charge of high explosive, could fire either a shell of the ordinary type with, say, 120 lb. bursting charge, or a weaker shell of the Gathmann type with 180 lb.

Probable effect of large charge of high explosive on modern ship.

The question to be decided, then, is whether, in order to have the power of firing a shell with 385 lb. of bursting charge as against one of 180 lb., it is worth while to sacrifice the power of piercing armour such as that which protects a battleship. The answer must depend on the answer to another question. What damage will the explosion of a charge of 385 lb. of high explosive do to a modern battleship?

The experiments narrated below showed that such a shell would do no harm if it struck a thickly armoured part of the ship, such as the belt, and experience with smaller shells indicates that the effect of the explosion is very local; so that if the shell struck the thin armour which forms the upper belt, though the plates might be crushed in, the structural damage would not be serious.

The effect of 385 lb. of high explosive bursting on board an unarmoured cruiser would almost certainly be decisive, but a battleship could destroy such a ship readily enough without resorting to her big guns at all. The function of the battleship is to fight her equals, and this would not be much forwarded by the use of very large shells.

Trials at Sandy Hook.

The trials carried out in America were between the Gathmann gun and the Army 12-in. gun (see Table I). This latter differs from the new pattern naval gun in being 35 cals. in lieu of 40; it also uses a projectile of 1000 lb. in lieu of 850 lb. Its energy is 36,700 ft.-tons, corresponding to a muzzle velocity of 2300 f.s. If the naval 850-lb. projectile were used in this gun, the velocity would be 2500 f.s., which is almost exactly that of the service Mark IX. gun. The Army 12-in. gun therefore fairly represents an up-to-date heavy gun as mounted in recent ships, but has much less power than guns now coming forward.

Targets.

The targets represented "the side construction of the latest type of (American) battleship." The armour plates were made by the celebrated Carnegie firm on the Krupp (K.C.) process; they were each 16 ft. long, $7\frac{1}{2}$ ft. wide, and $11\frac{1}{2}$ in. thick, and weighed 22 tons with the usual backing and inner skin. The guns were fired with reduced charges for the first two rounds, so as to give velocities corresponding to 2700 yards for the Gathmann gun and 4400 yards for the 12-in. At the third round the Gathmann gun fired a full charge, whilst that for the 12-in. gun corresponded to a range of 1900 yards.

Gathmann gun result.

TABLE II.—GATHMANN GUN.

Round.	Charge.*	Shell.		Striking Velocity.	Striking Energy.
		Weight.	Bursting Charge. Wet Gun-cotton.		
	lb.	lb.	lb.	f.s.	f.t.
1	260	1834	497	1650	34,610
2	260	1839	507	1650	34,700
3	310	1840	514	1970	49,500

The first round struck the centre of the plate and detonated; the plate was dished 1½ in., but otherwise uninjured. There was slight buckling of the plates of the cellular structure in rear of the frames, but the Committee reported: "Had this projectile struck the belt armour of a battleship, it would not have endangered the vessel."

The effect of impact of the second projectile was similar to the first; the plate, the backing, the frames behind the armour, and the wooden supports against which the whole structure rested remained practically uninjured. The bracket plates forming the sides of the coffer-dam behind the framing were still further buckled, allowing the right edge of the plate to move 2 ft. 9 in. to the rear. The Committee summed up the result of these rounds: "Neither of these rounds would have so far injured the structure of a ship as to endanger its buoyancy." The photographs (Plates V. and VI.) give a good idea of the effect. It will be noticed that the gases from the detonating shell dug a considerable hole in the ground in front of the target.

The third round was fired with a maximum velocity at less than 100 yards range, to determine if it were possible to inflict any damage whatever upon the plate by this system of attack. As a result of this impact there was a vertical crack 8 ft. distant from the point of impact, extending through a row of bolt holes and through the place struck in the preceding round. The backing, the skin plates behind the backing, and the wooden supports against which the structure rested were slightly displaced. The left-hand edge of the plate was thrown backwards about 15 in. under the top plate. The bottom left-hand side of the plate was shoved back about 4 ft. The whole structure, including the wooden supports against which the section rested, was revolved to the left about 30°. The top layer of deck plating was detached and thrown to the rear on top of the sand-butt

* Dupont smokeless powder.

PLATE V.—GATHMANN TARGET. FIRST ROUND.
Showing small effect of detonation of 500lbs. of gun-cotton.

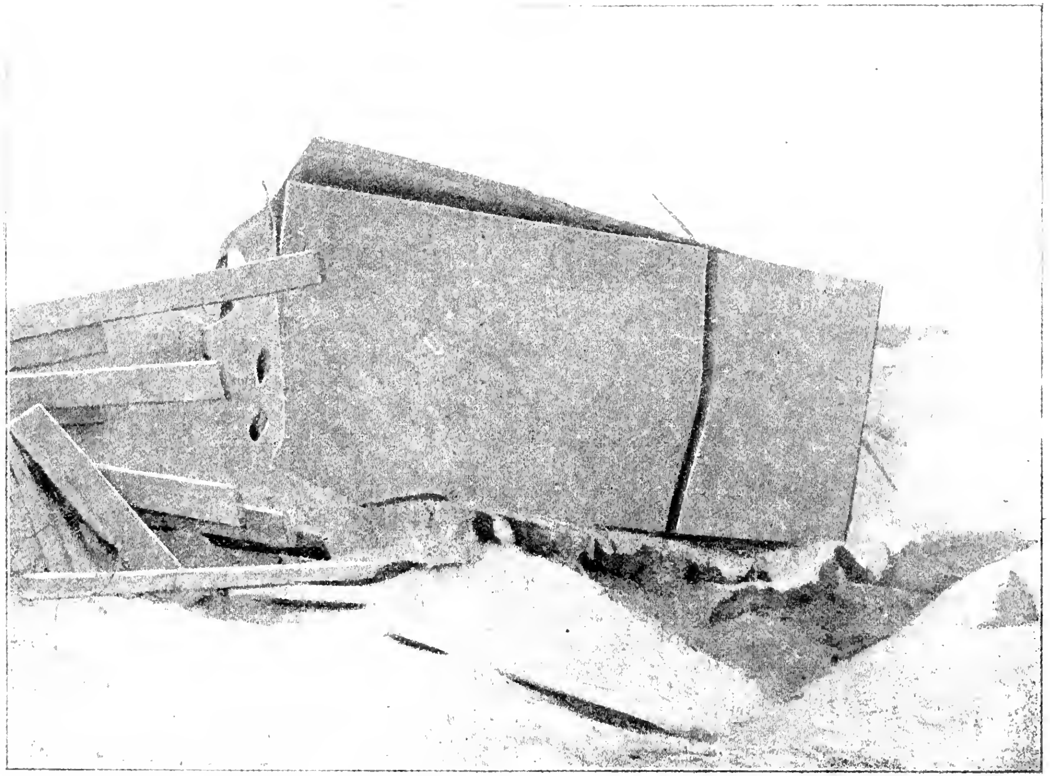


PLATE VI.—GATHMANN TARGET. THIRD ROUND.
Showing bending and fracture of plate, also displacement of target by accumulated effect of three rounds.

about 10 ft. (see Plate VI.). The metal structure behind the armour on the left-hand side of the target collapsed. The Committee summed up the result as follows: "It is evident that had this shot struck the belt armour of a battleship, it would have resulted in no injury to the internal mechanism, the armament, or the *personnel* of the vessel, and would not have seriously menaced its buoyancy. While the target structure was very much damaged by the accumulated effect of the pounding resulting from these three shots striking with a total energy of 119,000 ft.-tons, neither shot would of itself have endangered the buoyancy of a battleship or have wrought serious local damage."

12-inch gun.

12-IN. ARMY GUN.

Round.	Charge. Dupont Smokeless Nitrocellulose.	Projectile.			Striking Velocity.	Striking Energy.	By Tresidder's Formula.	
		Nature.	Weight.	Bursting Charge.			Penetration. Wrought Iron.	Figure of Merit.
	lb.		lb.	lb.	f.s.	f.t.	in.	
1	237	Midvale A.P. Shot	1001	19½ Dunnite	1800	22,500	26·5	2·30
2	204	" "	1006	23 Maximite	1804	22,700	26·6	2·31
3	237	Midvale A.P. Shell	1045	60 Dunnite	2073	31,000	33·4	2·90

The first round struck the centre of the target, perforated the plate, making a clean hole about 13 in. in diameter, and detonated in rear. The angle of opening of the cone of dispersion of the fragments was about 35°, and the backing, skin plates, frames, and coffer-dam plates were completely demolished inside this cone. Plate VII. shews the clean hole made by this projectile; there were no cracks and only one large flake under the point of impact.

The second round struck the right centre of the target, penetrated the plate to a depth of 9½ in., punched out a large disc, detonating as it did so. Diameter of hole, 15 in. in front, 36 in. in rear (see Plate VII.). The right side of the plate, 4 ft. in breadth, was broken off by a vertical crack through the point of impact. A horizontal crack, passing through the two holes made by the first two rounds, almost severed the plate in two. Large fragments of the plate, together with the projectile, were carried through the backing and penetrated 5 ft. into the sand-butt in rear. There was great destruction in rear caused by these fragments (see Plate VIII.).

The first two rounds, which proved so destructive, were fired with armour-piercing shot, the small cavity being filled with Dunnite and

PLATE VII.—12-INCH GUN TARGET AFTER SECOND ROUND.

A.P. Shot (cavity filled with high explosive). Showing clean hole made by first round, and jagged hole with cracks made by second round.

Third round with armour-piercing shell.

Maximite respectively, and a base fuze inserted. For the third round an armour-piercing shell was used which contained 60 lb. of Dunnite (5·7 per cent. of the weight of the shell). The velocity was increased from 1804 f.s., corresponding to a range of 4400 yds., to 2073 f.s., corresponding to 1900 yds.; and the energy from 22,700 to 31,000. This addition to the velocity would give an increase of penetrating power of 3 in. Krupp steel over that possessed by the previous rounds —viz., from 11·5 in. to 14·5 in. The shell struck midway between the bottom of the plate and the horizontal crack which ran from the centre to the left edge, and about 3 ft. to the left of the centre impact. It penetrated about 6 in. and detonated, punched out a piece of plate some 15 in. in diameter, and drove it through the backing, skin and sand-butt. The left lower corner, about one-quarter of the plate, was broken into six pieces and driven into the structure and butt (see Plate IX.). One fragment weighing $1\frac{1}{2}$ tons passed through about 15 ft. of sand, and was found 135 ft. in rear. The cellular structure, representing the frames of the ship, coffer-dam, &c., previously much damaged, was now completely demolished.

Remarks on plate and projectiles.

There have been so few trials to determine the resisting power of thick Krupp plates that it is not easy to say if the plate attacked by the 12-in. gun was up to the average in resisting power. In our last year's estimate of the resistance of 12-in. Krupp plates we put the figure of merit at 2·33 as compared with wrought iron. The Carnegie plate now under review was pierced by projectiles having a piercing power of 2·30 by Tresidder's formula; it therefore fell somewhat short of this estimate. Krupp, in June, 1896, tried a plate which defeated a blow with factor 2·33, and a Carnegie plate in 1898 defeated one of 2·09, but was pierced at 2·41. Both these plates were probably above the average of their day, and since then there have been no trials other than the ordinary reception tests, when a plate is only subjected to a blow giving a factor of 1·9 to 2·0, which is easily borne without cracking.

On the whole, there is no reason to suppose that the plate was not up to the average; the American Board which superintended the trials make no remarks as to its quality, and accept the results as reliable. The projectiles also seem to have been of good quality; the first did extremely well, the second and third got through by punching, as is most commonly the case when a Krupp plate is overmatched.

There is much that calls for serious consideration in the result of this experiment.

Deduction as to sufficiency or otherwise of armour of.

The armour plate was by Carnegie, one of the most successful makers of Krupp armour, who has obtained remarkably good results in previous trials.

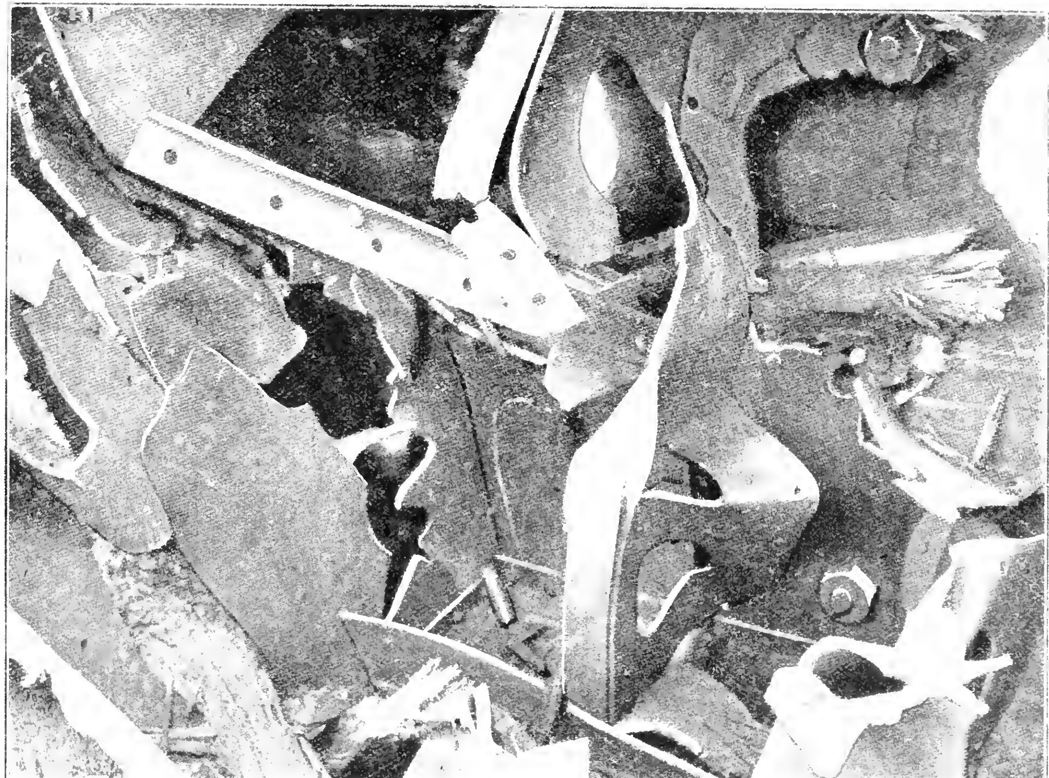


PLATE VIII.—REAR OF 12-INCH GUN TARGET AFTER SECOND ROUND.
Showing hole (at right top corner) and destruction of framing caused by A.P. Shot (cavity filled with high explosive).

It may be taken as a fair example of the thickest plating for ships now building and designed, as the following table shows :—

	Inches.	Penetrable at ranges as under by uncapped projectiles.			
		12″ gun with present velocity.		12″ gun with improved powder.	
		Direct.	30° to normal.	Direct.	30° to normal.
		yards.	yards.	yards.	yards.
Carnegie Trial Plate	11·5	4400	2000	6400	4000
Thickest armour of King Edward .	12·0	4000	1600	6000	3600
,, ,, République . .	11·0	5000	2500	7000	4600
,, ,, Borodino . . .	11·0	5000	2500	7000	4600
,, ,, Wittelsbach . .	9·8	6000	3300	8000	5300
,, ,, Vittorio Emanuele	9·8	6000	3300	8000	5300
,, ,, Georgia . . .	12·0	4000	1600	6000	3600

It scarcely seems satisfactory to build ships with no armour thicker than 12 in., which this experiment proves can be penetrated with disastrous results at a range of 4000 yards by a gun equal in power to our 12-in. IX. (V. = 2500). Moreover, by the time the ships lately laid down are completed, it is almost certain that, owing to the introduction of nitro-cellulose, the velocity of the 12-in. gun will have increased to 2800 f.s. (for 850-lb. shell), which will pierce a 12-in. plate at 30° to the normal at 3600 yards. If the 11-in. and 12-in. plates are meant to act as safeguards against 12-in. projectiles, they are too thin; if simply required to keep out shot from Q.F. guns, they are unnecessarily thick.

High explosive shell.

The writer does not attach very much importance to the use of high-explosive bursting charges for projectiles used for the attack of thick armour. The spread of the fragments of the first Dunnite-filled shot, which apparently detonated when almost through the plate, was no more than 35°. The fragments of an ordinary armour-piercing shot would cover this area after penetrating. Thick plates are only placed on the belt and barbettes. If a barbette were pierced, the fragments projected by a shot would be sufficient to put the guns out of action without any explosion inside. And if the belt were pierced, there are no men immediately behind it to be demoralised by an explosion.

Moreover, there was no oblique firing, which invariably breaks the projectile on impact and prevents the burst taking place inside.

Still, the experiment showed that the presence of a high-explosive bursting charge in an armour-piercing projectile need not impair its penetrating powers. Such a projectile would be much more formidable than a shot when striking thin armour or unarmoured parts if there

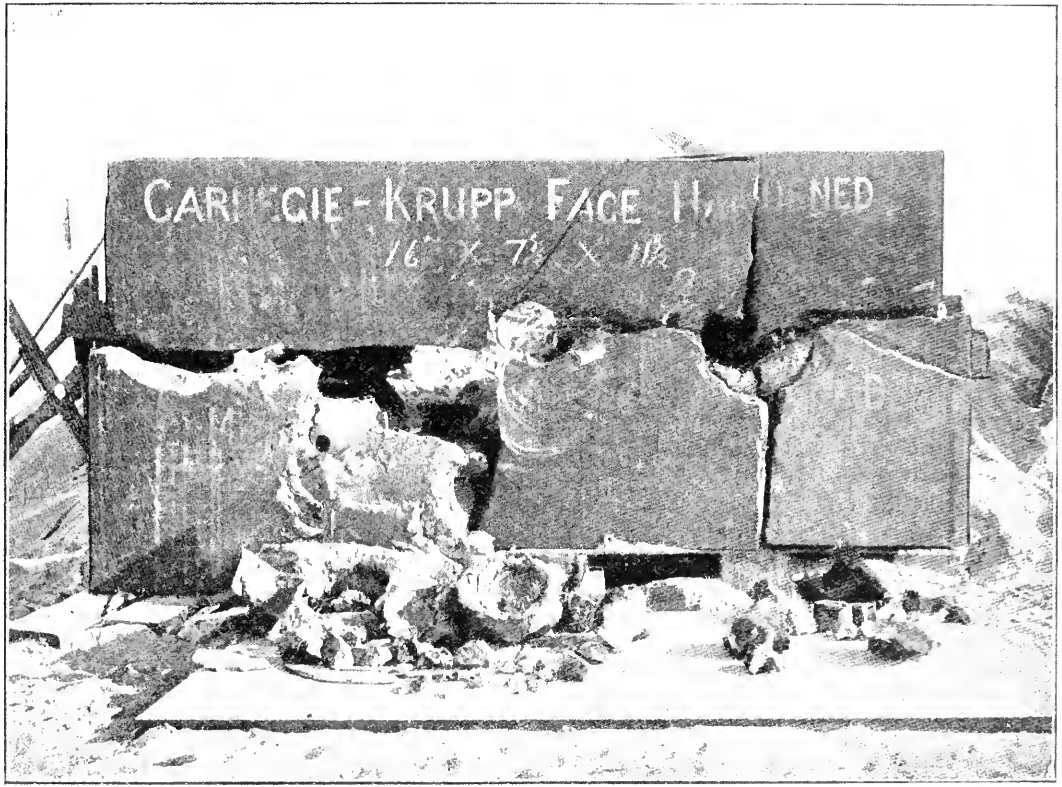


PLATE IX.—12-INCH GUN TARGET AFTER THIRD ROUND.

A.P. Shell filled 60lb. of Dunnite. Showing fragments recovered in rear of target collected in front. The circular lump of metal in the centre is the piece punched out

were much space inside the armour over which the effects of the explosion could spread. But with guns in casemates or small turrets a heavy armour-piercing shell could scarcely do more than destroy the one struck, which a shot would do equally well. And a *safe* base fuse is a necessity, unless a hole can be drilled through the head of an armour-piercing shell to admit of a nose fuse. Hitherto base fuses have always been associated with occasional* premature bursts in the bore, which with high-explosive bursting charges entails the destruction of the gun.

Power that armour possesses to neutralise the effect of non-penetrating shell.

The experiment was conclusive as to the value of armour for preserving the ship and her crew from the effects of shell that cannot penetrate. If 500 lb. of gun-cotton hurled at a 12-in. plate with over 1900 f.s. velocity was incapable of doing any harm on the further side, what possible chance is there that shells containing less than a sixth of this charge would cause any inconvenience on the further side of a plate, say, half this thickness, near which they might burst?

Once more it has been most forcibly demonstrated that the armoured ship must be attacked with armour-piercing projectiles. The Belleisle experiments of 1900 proved the uselessness of pointed shells made of such an inferior metal as ordinary cast steel against even poor wrought-iron armour, and the Gathmann trials show clearly enough that an armour plate is perfectly capable of shielding those behind it from the effect of an enormous charge of high explosive detonated in contact with it.

Necessity of armour-piercing projectiles.

In an up-to-date armoured ship, whether battleship or cruiser, all the essential part of the armament and all the crew will be under the protection of vertical armour or beneath the armoured deck. A loose idea seems to prevail in many quarters that showering weak common shell at such a ship will cause general demoralisation. There is no justification whatever for such an impression. Shells by the hundred burst against the armoured ships of the Monitor and New Ironsides types in the American Civil War, with no effect on those inside, and non-piercing shells will have no more effect in the present day. If in an armoured ship all the light unprotected guns are manned and provided with large ammunition parties, these men will suffer greatly at the opening of an action from the long-range high-explosive shell fire with which the action will begin. Moreover, the destruction of whole guns' crews at a distance from the enemy where their guns are outranged and well-nigh useless might certainly cause demoralisation. But this demoralisation would be due not so much to the shell fire as to the unnecessary exposure of men, who would realise that they were being sacrificed for no sufficient reason. As soon as all

* If only one shell in 1000 bursts in this way it would still be a serious matter.

unprotected guns are silenced it is absolutely essential to fire armour-piercing projectiles, and woe betide the ship whose supply should run short. The torpedo will prevent ships approaching nearer than 2000 yards, and there will be much missing with the armour-piercers. "Then you will have to take to common shell," is the ordinary advice. "You cannot possibly expect to hit such a small object as a barbette or casemate with your armour-piercing projectile." But seeing that the effective target for the common shell, after the unprotected guns are silenced, consists not of the barbette or casemate, but only of a tiny gun-port or the muzzle of a gun protruding from the same, it is not clear how the advocates of the common shell will mend matters by giving up the firing of armour-piercers.

Progress in ballistics.

About the year 1890 guns of 40 to 45 calibres began to be manufactured, and there has been very little change since then in the length of the gun. All nations have adopted heavy guns of from 40 to 45 calibres, whilst 45 to 50 calibres are the accepted lengths of 6-in. guns and under. One of the first 40-calibre guns to be mounted afloat was the British 4·7-in. Q.F., which was closely followed by the 6-in. Q.F. These guns have a velocity somewhat below 2200 f.s., which ten years ago was considered a very high figure. As smokeless powders developed, the chambers of guns were enlarged and higher velocities were attained, and five years ago the velocity aimed at in new designs of guns was from 2500 f.s. to 2700 f.s.

Erosion due to nitro-glycerine powders and when high velocity is aimed at.

But it was found that when such velocities were obtained with nitro-glycerine powders, of which cordite and ballistite may be looked upon as the best known examples, the erosion proved to be very troublesome. The high temperature, combined with the rush of gas, causes a rapid enlargement of the gun at the point where the rifled part of the bore begins. The action of the gas is most apparent in attacking the lands, which, after a time, are so completely worn away that the gun becomes a smooth-bore for some distance from where the rifling commences. A heavy gun, after not much more than 100 rounds with full charges,* may be enlarged as much as half an inch, and would lose 150 f.s. or more in muzzle velocity. If firing be continued, the destruction of the rifling will presently become so serious that the projectile will not be properly rotated. The gun has then to be relined.

A consideration of these facts has caused a widespread desire for some propellant that would give the high velocities universally

* This does not prevent practice, for a reduced charge may be used which does not give one-tenth the wear of a full charge.

demanded without excessive erosion. All nations, save Great Britain and Italy, have now adopted some form of nitro-cellulose with which higher velocities can be obtained than with cordite, whilst the erosion is much less. In Great Britain experiments are being made, and the land service have adopted a modified form of cordite (Cordite M.D.) which contains less nitro-glycerine than the old service type. But it is understood that the Navy are not satisfied that the modified cordite is worth adoption, and that they prefer to wait until the Explosives Committee are in a position to recommend the adoption of a pure nitro-cellulose propellant.

High velocities recently obtained with nitro-cellulose.

A paper by Lieutenant Turpin, U.S.N., gives some interesting figures with regard to results obtained with the nitro-cellulose propellant adopted by the United States Navy. Thus we have the following, showing what has been done with a 50-cal. 6-in. gun in America:—

UNITED STATES SMOKELESS POWDER.

Weight of gun.	Charge.	Projectile.	M.V.	Energy.	Energy per lb. of powder.
tons.	lb.	lb.	f.s.	f.t.	f.t.
8·4	45·5	100	2922	5919	130

Lieutenant Dawson, R.N., of Vickers, Sons, and Maxim, to whom very much of the recent progress in gunnery in this country is due, gives the following figures as having been obtained in a 6-in. gun of 45-cal., the capacity of the chamber being 1560 cubic inches, as compared with 1715 cubic inches, the corresponding capacity for the 6-in. Mark VII.:—

ROTTWEIL SMOKELESS POWDER.

Weight of gun.	Charge.	Projectile.	M.V.	Pressure.	Energy.	Energy per lb. of powder.
tons.	lb.	lb.	f.s.	tons.	f.t.	f.t.
7	34	105	2844	17·9	5890	173
7	34	100	2922	17·2	5923	174

Here we have a charge of only 34 lb. Rottweil nitro-cellulose giving the same energy in a 45-cal. gun as that obtained in America with a 45½-lb. charge in a 50-cal. gun.

There is no doubt of the superiority of the latter propellant.

The following figures also show what a high power can be obtained from Vickers's 7·5-in. 50-cal. gun with a very moderate pressure:—

ROTTWEIL SMOKELESS POWDER.

Weight of gun.	Charge.	Projectile.	M.V.	Pressure.	Energy.	Energy per lb. of powder.
tons.	lb.	lb.	f.s.	tons per sq. in.	f.t.	f.t.
15	80	200	2903	15·9	11,700	146

It will be remembered that the German Rottweil firm was very much to the fore when brown powder superseded black. The same firm is once more to the fore now that it is a question of improving on cordite. It is hoped, however, that a British product may yet come to the front, and that we may not have to go abroad for our supplies of nitro-cellulose, as we did for brown powder.

The following charges of nitro-cellulose and cordite gave the same velocities in the 6-in. Mark VII. gun—viz., 2922 f.s. Comparison of weight and bulk of nitro-cellulose and cordite charges giving the same velocities.

	Weight.	Cartridge.			Size of chamber of gun.
		Diam.	Length.	Cubic contents.	
	lb.	in.	in.	c. in.	c. in.
Cordite	29·6	6·3	22·5	701	1820
Rottweil Nitro-cellulose .	34	6·5	31·2	1033	1560

The nitro-cellulose charge is 30 per cent. bulkier, and more magazine space will therefore be required, but the gun-chamber need not be so large, which is a decided advantage. Moreover, the 29½-lb. charge of cordite is practically inadmissible, owing to the enormous erosion, for which reason the present service charge of the 6-in. (VII.) 45-cal. gun is only 20 lb., giving an energy of 4300 ft.-tons as compared with, say, 5700 ft.-tons, which seems likely to be about the service energy with nitro-cellulose.

In the tables forwarded by Herr Krupp, which appear at the end of this section, the ballistics are apparently given for Rottweil powder, and even if some allowance be made for a manufacturer's estimate, which is often somewhat sanguine, there is no doubt that a great advance has been made, and that for the future velocities will not be much below 2900 f.s. British and American results corroborated by Krupp's tables.

In the table published on the authority of Lieutenant Turpin,

U.S.N., the following excellent result with a 40-cal. 12-in. gun is also given :—

Wt. of gun.	Charge.	Projectile.	M.V.	Energy.
tons.	lb.	lb.	f.s.	f.t.
52	353	850	2822	46,950

Krupp's figures for a 40-cal. 12-in. gun are almost identical—viz., 45,500 ft.-tons of energy.

The American 50-cal. 5-in. gun has also passed a satisfactory proof, the velocity being 3200 f.s. with 60 lb. shell and pressure 18 tons, showing that the estimated velocity of 2900 f.s. can readily be reached without exceeding the service pressure of 16 to 17 tons.

We may take it, then, as fairly well established that velocities of from 2800 f.s. to 2900 f.s. will soon be common enough both for heavy and light guns, always supposing that nitro-cellulose exhibits good keeping qualities and gives regular results. Some of the rounds reported from the United States leave a good deal to be desired in respect of regularity ; thus, in the Gathmann trials, the 12-in. Army gun gave the following results with two similar charges of Dupont smokeless nitro-cellulose :—

Charge.	Projectile.	M.V.	Pressure.	Muzzle energy.
lb.	lb.	f.s.	tons per sq. in.	f.t.
237	1001	1807	9·5	22,685
237	1045	2080	12·8	31,395

Here we have a difference in energy of 8710 ft.-tons in two rounds. The first charge, for some reason not explained, only gave the extremely meagre result of 96 ft.-tons per lb. of powder, whilst the second gave the fairly normal result of 132 ft.-tons. There was thus a difference of some 36 per cent. in the two rounds, showing that the first charge did not ignite properly.

Again, we have in the 4-in. 50-cal. gun :—

Charge.	Projectile.	M.V.	Pressure.
lb.	lb.	f.s.	tons.
15·5	32	2891	15·9
15·5	32	3046	17·6

The difference is not so startling, but still it is considerable, and there seems a good deal yet to be learnt in America as to the best method of obtaining regular results with certainty.

The American nitro-cellulose powders are difficult to ignite—more difficult than cordite—and therefore require large primers of black powder. The result is that there is an appreciable amount of smoke, especially with the larger calibres. The charge for the 13-in. American gun has a primer of rifle powder weighing no less than 14 lb.; the 12-in. gun used for the Gathmann trials had 7 lb. only. Possibly the relatively small primer used on that occasion may account for the irregular velocities. The reduction of the primer beyond a certain point causes long hang-fires, decreased velocities, and increased pressures. Primers of smokeless powders have been tried without success, and at present, at any rate, there is no efficient substitute for black powder. When a smokeless primer was tried in the 6-in. in America there was an appreciable hang-fire, and the pressure rose from 16 to 20 tons. Smoke produced by new powders.

There have been various explosions owing to the accidental ignition of smokeless powders, but whether caused spontaneously or otherwise is not altogether clear. At Mare Island Navy Yard, San Francisco, a magazine containing 300 tons of smokeless powder, worth £100,000, exploded on June 5th, 1901. In this instance there was no one near the magazine, so that there seems no other explanation save that the explosion was spontaneous. It is understood that since this accident a good deal of the smokeless powder issued to American ships has been condemned, but the naval authorities appear to be satisfied with the type of powder now being made, which is presumably a decided improvement on that condemned. Stability of new powders.

The cost of nitro-cellulose will apparently be more than double that of cordite; not only is it more expensive weight for weight, but far larger charges are used to obtain high velocities. Thus a single nitro-cellulose charge for the American 12-in. gun costs £60, and eighty rounds £4800. The corresponding figures for 12-in. Mark IX. using cordite would be about £1600 for eighty rounds. Any economy gained by the decrease of wear, which renders lining less frequent, is more than compensated for by the extra cost of the ammunition. Expense of nitro-cellulose.

But since higher velocity can be attained with nitro-cellulose it seems bound to come in, regardless of cost—provided that regular results can be obtained and the stability of the product is assured, and with reference to this there is every reason to be confident that such difficulties as exist will be overcome.

The advantage of increased velocities is twofold. First, the "dangerous space" being increased, the number of hits in a given Effect of increased velocities.

time is greater, and, secondly, there is greater damage on hitting both with shot or shell. To take the latter first, it is not commonly known that the damage done by a shell is much more due to the velocity at which it was travelling before it burst than to the action of the bursting charge. The main value of the latter is to scatter the fragments. If a shell be burst at rest, none of the more important fragments attain a velocity of more than 500 f.s., and the majority much less than this. But if the shell be burst when it has a velocity of 2000 f.s., the velocity of the fragments is from 1500 f.s. to 2500 f.s., and their energy is sixteen-fold greater than if the burst took place at rest. The above refers mainly to common shell. The additional value of armour-piercing shot and shell owing to an increase of velocity is readily to be gauged by the increase of piercing power and the greater destruction after penetration.

Improvements in recent guns.

The following table shows some of the improvements that have taken place, especially as affecting ships still occupying an honourable place in the list of effective men-of-war:—

GUNS FORMING THE PRINCIPAL ARMAMENT OF BATTLESHIPS AND ARMOURED CRUISERS.

PENETRATING POWER AND RATE OF FIRE OF HEAVY GUNS.

Ship.	Guns in order of piercing power.	Weight.	M.V.	Weight of projectile.	Penetration Krupp steel 3000 yds.	Rate of fire.
		tons.	f.s.	lb.	in.	Rds. per min.
Georgia . . .	12" 40 cal.	52	2800	850	16·0	—
Tsarevitch . . .	12" ,, ,,	—	2750	731	13·5	—
Implacable . .	12" ,, ,,	50	2500	850	13·0	1·2
Suffren	12" ,, ,,	—	2870	644	13·0	—
Majestic . . .	12" 35 cal.	46	2370	850	11·5	0·9
West Virginian .	10" 40 cal.	34	2800	500	11·5	1·5*
Royal Sovereign .	13·5" 30 cal.	67	2020	1250	11·0	0·4
Cressy	9·2" 46 cal.	27	2650	380	9·5	3·0
Renown . . .	10" 32 cal.	29	2040	500	7·0	0·7
Devonshire . .	7·5" 45 cal.	14	2800	200	7·0	3·5*
Edgar	9·2" 32 cal.	24	2060	380	6·0	0·7

If we consider the heavier guns, we see the very great advantage that the Georgia holds over the Majestic owing to the improvement in 12-in. guns. The penetration has increased 40 per cent., and the rate of fire may probably be greater. Again, though the Royal Sovereign's guns and projectiles weigh 40 per cent. more than the Implacable's, the penetrating power is 2 in. less, and the rate of fire only one-third. Moreover the Implacable, when attacking an

* Estimated.

11-in. or 12-in. plate, has a little in hand to allow of some obliquity of fire, whilst the Royal Sovereign has no margin even when attacking an 11-in. plate, so that the effective hits of the Implacable would be, say, four times as many as those of the Royal Sovereign. Again, if the new 10-in. guns of the West Virginia be compared with the Royal Sovereign's 13·5-in., we see that the penetration is the same, the rate of fire of the 10-in. about three times as great, and the weight of gun and ammunition about one-half. If the Royal Sovereigns are to be reboilered in two or three years, the shifting of their heavy guns is imperative, but could they carry 12-in. guns without also removing the barbettes, with their cumbrous and inefficient 17-in. armour, and replacing them by modern ones with 11-in. Krupp armour? Lower down the table a similar result is obtained if the Renown's and Devonshire's guns be compared. Here the 7·5-in. obtains the same penetration as the 10-in., has five times the rate of fire, and is less than half the weight.

Why the basis of rate of fire and penetration should mainly be considered.

But is it fair to compare the guns on a basis of rate of fire and penetration without taking into account the weight of the bursting charge in the common shell? Decidedly so, since for heavy guns the main and principal function is to pierce the armour of either the water-line or turrets; and the more holes the more water admitted, the more compartments flooded, and the more heavy guns disabled. The Gathmann trials have shown the futility of bursting shells outside the armour. And if it is only a question of throwing a great weight of non-penetrating shells into an opponent, the lighter Q.F. guns are the best for that purpose. The Majestic's 12-in. guns leave a great deal to be desired, but still, looking at their rate of fire and the fact that their penetrative powers can probably be increased an inch by the adoption of a nitro-cellulose charge, they may still be considered good enough.

Changing the 10-in and the 9·2-in.

With regard to the moderate-sized guns in the table, the Edgar's guns are hopelessly outclassed, as are also the Renown's. The Edgar is too small and weak a ship to engage an armoured cruiser with 6-in. armour, so she does not need a gun with much piercing power. All that she requires is an increase in the rate of fire of her protected 6-in. guns. Two pairs of the latest 6-in. in double turrets should replace the two 9·2-in. They would fire at least eight rounds to the 9·2-in. one, and would have sufficient piercing power, whilst their protection would be greatly superior. The 10-in. guns of the Renown, Centurion, and Barfleur should also be changed, the 9·2-in. being the best substitute, always supposing that the weights would admit of it. Otherwise the 7·5-in. would be a decided improvement on the 10-in.

Improvements in Q.F. guns.

The following table shows how the matter stands as regards improvements in the Q.F. guns :—

Ship.	Guns in order of piercing power.	Weight.	M.V.	Weight of projectile.	Penetration. Krupp steel 3000 yards.	Rate of fire.
		tons.	f.s.	lb.	inches.	
New U.S. battleship	7″ 50 cal.	13·3	2900	165	6·5	3·5*
République	6·48″ 45 cal.	—	2870	115	5·5	4*
King Edward	6″ 45 cal.	7	2800†	100	5·0	4
Implacable	6″ 45 cal.	7	2500‡	100	4·0	4
Charlemagne	6·48″ 45 cal.	$6\frac{1}{2}$	2625	99	3·8	4*
Majestic and Royal Sovereign	6″ 40 cal.	7	2150‡	100	3·2	4
Kaiser class	5·9″ 40 cal.	6	2400	88	3·2	4
Bouvet	5·46″ 45 cal.	4	2525	66	3·2	4*

As with the heavy guns, the improvements of the last few years have increased the penetration of a gun of given calibre more than 50 per cent. But in the same period the protection of the secondary armament has gone up 100 per cent., so that it is necessary to increase the calibre of the gun. The French have gone up from 5·46 to 6·48, the Americans from 6-in. to 7-in., the Germans are likely to adopt a 6·7-in. gun, and we should certainly adopt the 7·5-in. as a battleship gun. It will deal with 7 in. of Krupp armour at 3000 yards, which is an immense improvement on the 5 in. of the best 6-in. gun. Still, although penetration is very important with these guns, it is not of such supreme moment as with the heavier guns, and in rate of fire there is little to choose between the newer and the older types. Moreover, it will be quite possible to get a very fair velocity out of the 40-cal. 6-in. by enlarging the chamber, whereas the old 9·2-in., 10-in., and 13·5-in. are hopeless in this respect—the guns are far too short, and are too weak in front of the trunnions to stand the high forward pressures necessary with high velocities. There is not, therefore, very much of a case for shifting the older 6-in. Q.F. guns, unless, indeed, 7·5-in. guns could be substituted. But this would entail such expense and difficulty that the ships are scarcely worth the serious modifications that would be necessary. At the same time it is urgently necessary that every new battleship should have nothing smaller than the 7·5-in. The old battleships in the line will supply any amount of 6-in. shell fire for many years to come. But the new ships should do the penetration, and for this purpose the 6-in. is useless. The Americans are mounting 50-cal. 7-in. in the batteries of their latest battleships, and although, as the photograph shows (see Plate X.), there is a very great difference in the size and weight of the 6-in. and 7·5-in.

* Estimated. † With nitro-cellulose. ‡ With cordite.

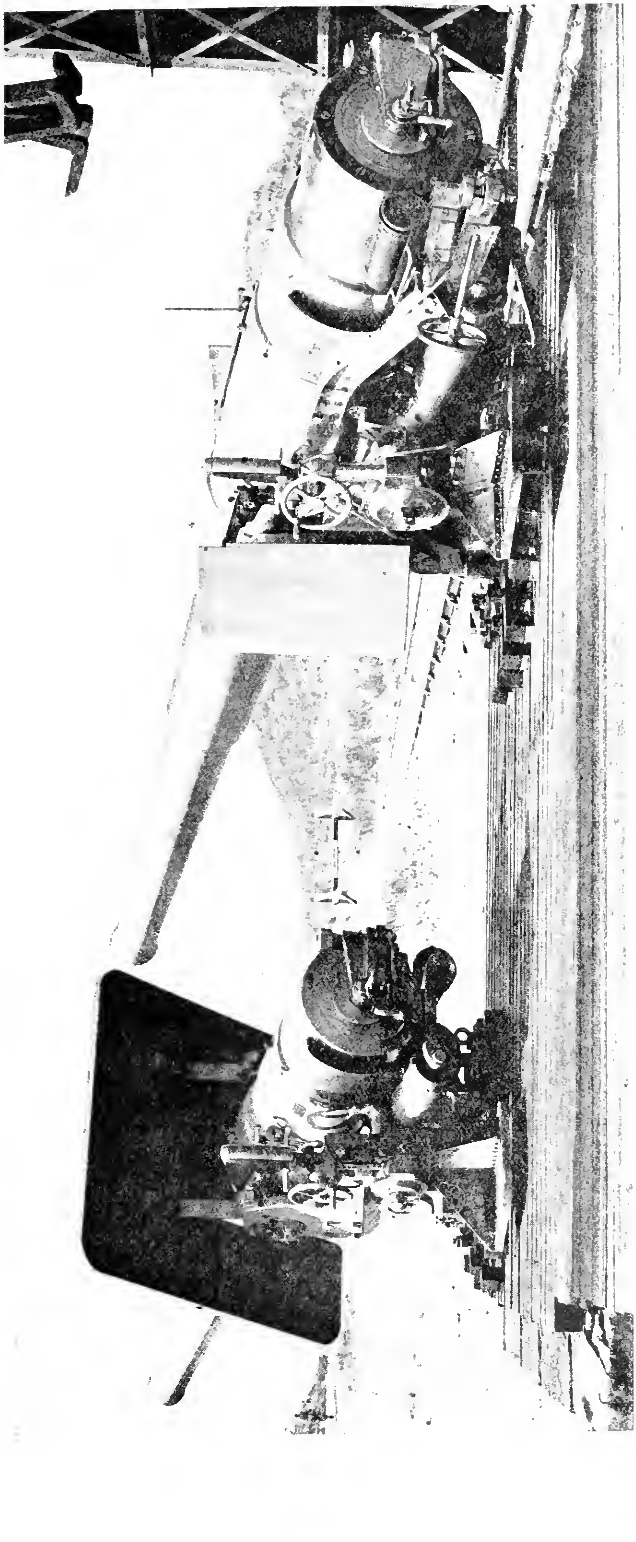


Plate X.—6-inch and 7·5-inch Vickers Guns.

still there should be no insuperable difficulty in going back to the old days of a battery of 15-ton guns on the broadside. The writer can conceive of nothing more unsatisfactory than that on the completion of the splendid ships of the King Edward class they should fall into the same category as the Nile, Barfleur, Powerful, Arrogant, Minerva, &c., &c., all of which, being much under-gunned when built, have had to be laid up for months whilst new guns are being supplied, which guns should have been put into the ships originally.

Dangerous space.

If the introduction of nitro-cellulose increases the M.V. of a 6-in. gun from 2493 f.s. to 2922 f.s., the dangerous space at 2250 yards for a target 27 ft. high is increased from 285 to 390 yards. Or, to put it another way, if at 2250 yards the range be guessed 200 yards wrong, there will be a vertical error of 19 ft. in the one case and of only 14 ft. in the other, a difference of 35 per cent. There would be a rather greater advantage accruing from similarly increasing the velocity of the 12-in. gun. If all the misses were due to miscalculation of the range, the shooting would improve in the same proportion But if only one-third of the misses are due to this cause, there would still be an improvement of 12 per cent., which would have a greater effect than the adding of a gun to a battleship's broadside, or it would make eight ships with the improved guns equal to nine ships with the old. (See also the annexed diagram, furnished by Lieutenant Dawson, R.N.)

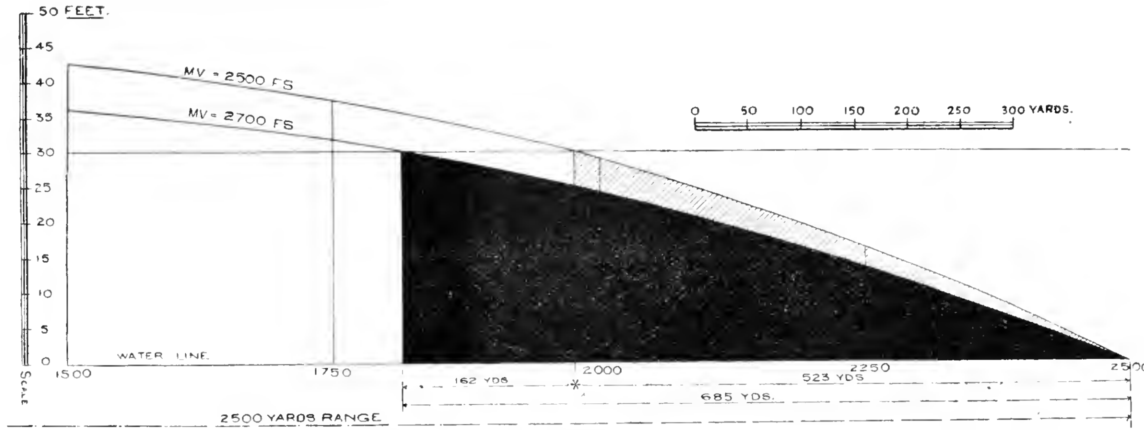


PLATE XI.—12-INCH B.L. GUN.

Dangerous space increased from 523 yards to 685 yards by increasing velocity from 2500 f.s. to 2700 f.s.

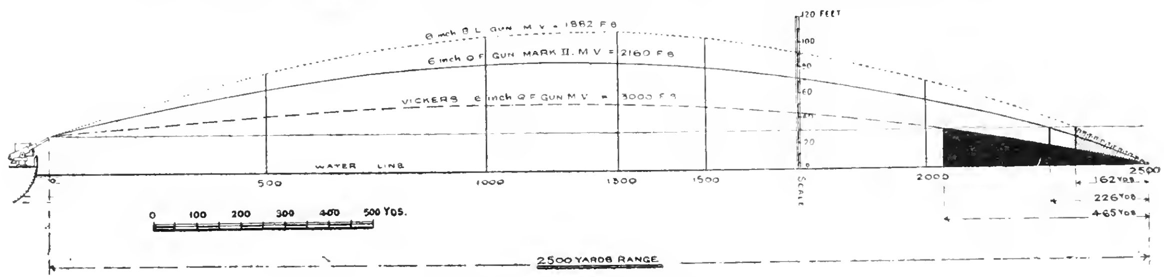


PLATE XII.—6-INCH B.L. GUN.

Dangerous space increased from 226 yards to 465 yards by increasing the velocity from 2160 f.s. to 3000 f.s.

CHAPTER IV.

Rapidity and Accuracy of Fire.

Recent improvements.

It is not so many years ago that the excellent custom was introduced of having trials of guns and mountings on board a new ship, but these gunnery trials of ships went on for some years before a rapidity test was instituted. It is now so thoroughly recognised that rapidity in loading, laying, and supply of ammunition is one of the most important features in guns of all sizes and styles that rapidity trials are carried out almost as a matter of course on the completion of a ship.

Sir W. Armstrong and Co. have always been to the fore when any improvements in the mounting and working of guns have been in question, so that it is natural, in reviewing the advance that has been made during the last twelve months, to refer first to the trials of ships in which Elswick mountings are used.

Trials of Mikasa

The Mikasa, if not, as many hold, the finest battleship yet completed in this country, is undoubtedly equal to the best, and her trials were naturally looked forward to with great interest. The ship is generally similar to our Formidable, but she carries very little armour before and abaft the barbettes. On the other hand, she has a main deck battery in lieu of casemates, with each gun completely isolated from its neighbour by 2-in. screen bulkheads. She also has 14 6-in. Q.F. in lieu of 12 in the British ship. Last, but not least, her barbettes have 14-in. armour in lieu of 12-in.

Trial of Rapidity of Loading 12-inch Gun.

	Round.	Time from "Load" to "Ready" or "Fire." sec.
After barbette (without laying).	1	40
	2	40
	3	50
	4	30
Fore barbette (laid at target).	Starting with gun empty. Loaded and fired 3 rounds in 2 min. 23 sec., or 48 sec. per round.	

Note.—A mistake with a lever caused a delay of 25 sec. But for this the time would have been 40 sec. per round.

The breech was worked with the greatest ease throughout. The screw is practically parallel. The mounting consists of the usual turret and turntable, with heavy oval shield running on a roller ring. A working chamber is attached beneath, in which the work of

transferring the ammunition from the central tube to the loading hoist is carried out. The ammunition hoist in the Mikasa differs from that in the Formidable in that the charge and projectile come up together in the Japanese ship and separately in the British one. The ammunition hoist having brought up the charge and projectile to the working chamber, it is there shifted to the loading hoist, which conveys the loading cage up to the gun-chamber, where the guns are locked at an elevation of $4\frac{1}{2}^\circ$, so as to be opposite the chain rammer and loading cage.

In the Formidable the trials consisted of firing the guns alternately in the service manner. This is slower than firing independently, for a gun may have to wait for its neighbour. Starting with both guns empty, the two guns fired ten rounds between them in 4 min. 56 sec., or one round per minute from each gun. Formidable's trials.

Curiously enough, if there is no error in the newspaper reports, the rapidity trials of the Irresistible gave almost identical results—*viz.*, 4 min. 46 sec. for ten rounds. Presumably the guns were empty at the start, though it is not so stated. Irresistible's trials.

The Irresistible's mountings are to designs submitted by Vickers and Co. In this type the loading gear and cage are attached to the slide of the gun, so that the loading can be carried out at any elevation. The weight of the loading gear also acts as a counterbalance to the chase of the gun, and allows of the guns being placed further out, so that the muzzles project further over the ship's side than would otherwise be the case, a most important matter when considering the effect of blast on neighbouring guns. The above times cannot be considered as representing what may reasonably be expected from a thoroughly trained crew. The men, though smart and capable, were strangers to the mechanism, and we confidently expect that ten rounds will yet be got off in 4 min.

The conditions for prize-firing are similar to those prevailing in the Mikasa trials—one gun only being fired as quickly as possible. Under these conditions the Mars, starting with the gun loaded, fired eight rounds in 6 min., or, allowing 10 sec. for firing the first round, at the rate of 50 sec. per round. But the Majestic class are allowed in prize-firing to use the all-round auxiliary loading position, to which the supply of projectiles is most faulty, for only eight shell are carried there, and they cannot be replaced without great delay. After the eight rounds the rate of fire of the Mars would be reduced about 50 per cent., so that the above is not so much a practical demonstration of what the Majestic class can do, but rather an argument for rearranging the loading arrangements of these fine ships. The fixed loading station is most objectionable, not only Times compared with those obtained in prize firing.

because the rate of fire is much slower, but also because of the serious exposure of the guns and barbette-hood when loading; besides which the guns have to be loaded simultaneously, but fired in succession, so that after a gun has fired it cannot begin loading until its neighbour has been discharged. Thus, besides the time lost in training to the fixed loading position, which, being fore and aft, means training 90° in the ordinary broadside action, there is the further loss of time due to the guns waiting for each other.

The Glory, with all-round loading gear, fired 28 rounds from four guns, each gun firing for 6 min. (starting loaded). It is very possible, therefore, that one or more of her guns may have equalled the eight rounds fired by the Mars.

9·2-in. guns in single barbettes. The working of a pair of guns in the same barbette undoubtedly leads to difficulties, and as regards rate of fire the single gun will always have an advantage over one of a pair. Some of the success in obtaining rapidity of fire from the 9·2-in. is due to this cause, but much must be attributed to the improvements in handling the projectile which have been introduced by Messrs. Vickers, and to a lesser degree the simple method of working the breech. The former is shown in Plate XIII. The projectile is hoisted by power to a swinging loading-tray attached to the cradle. The breech opens to the right, and the projectile is immediately swung in from the left. The breech is worked by the single motion of a long lever, as shown in Plates XIV. and XV. This has a considerable advantage as regards rapidity over the hand-wheel gear, always supposing that the pad is readily seated and does not stick when opening the breech. Trouble has occurred with sticking pads in opening the breech, and more still in closing; but various remedies are being applied, some one of which may, it is hoped, prove successful.

The following rates of fire have been obtained with the 9·2-in., the gun being fired under service conditions:—

H.M.S. Cressy	5 rounds, 100 sec.
Experimental gunboat	,, 90 ,,
H.M.S. Aboukir	,, 85 ,,
H.M.S. Sutlej	3 rounds per minute easily.

The 9·2-in. gun is therefore a genuine Q.F. as at present mounted. The improvement is immense. The guns of the Edgar class, the last of which ships was not completed till 1894, take 86 sec. between two rounds. The rate of fire has, therefore, increased from four to five times, and the two guns of the Aboukir class are worth eight in the Edgar class. This promotion of the 9·2-in. to the ranks of the Q.F. makes it inevitable that this gun will shortly be the principal weapon in the secondary armament of our new battleships.

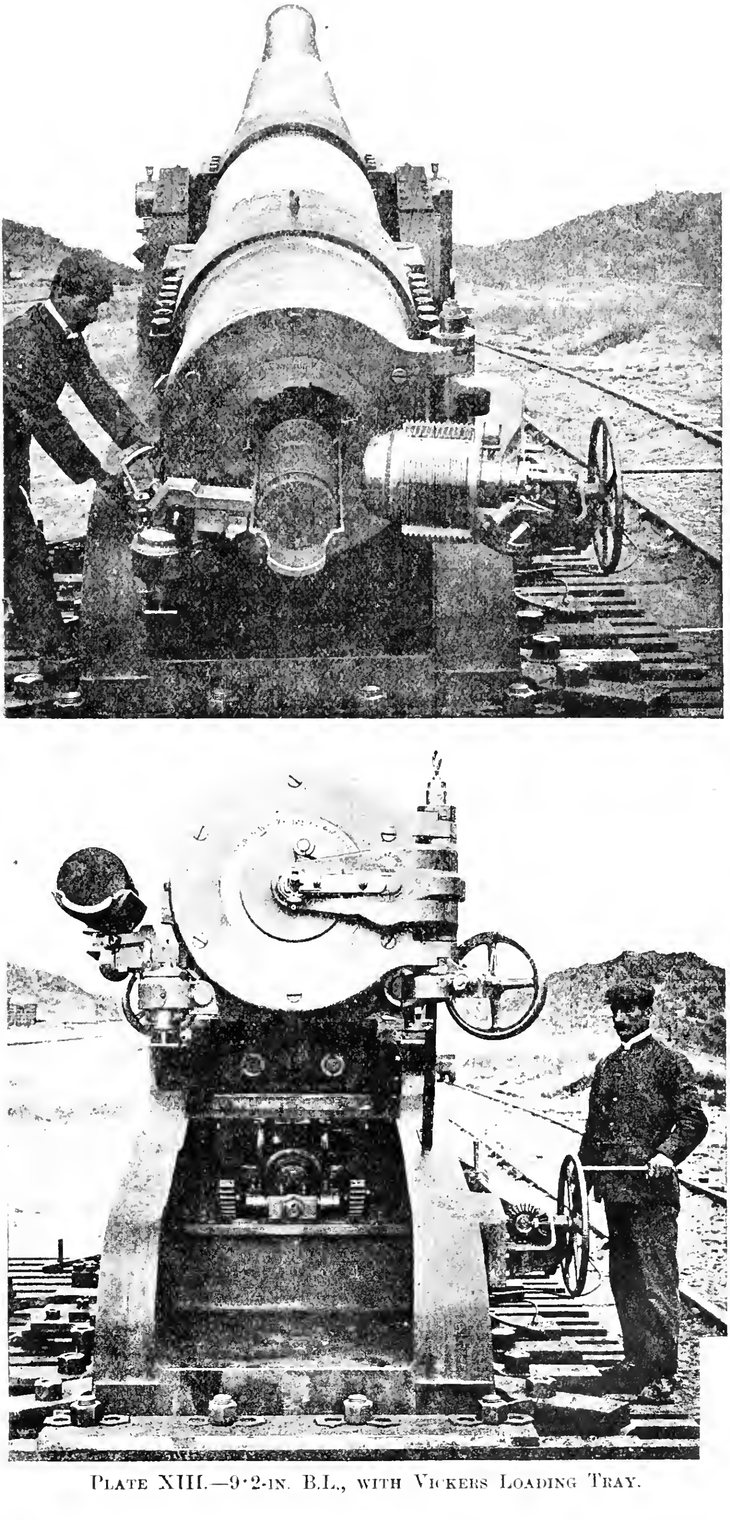


PLATE XIII.—9·2-IN. B.L., WITH VICKERS LOADING TRAY.

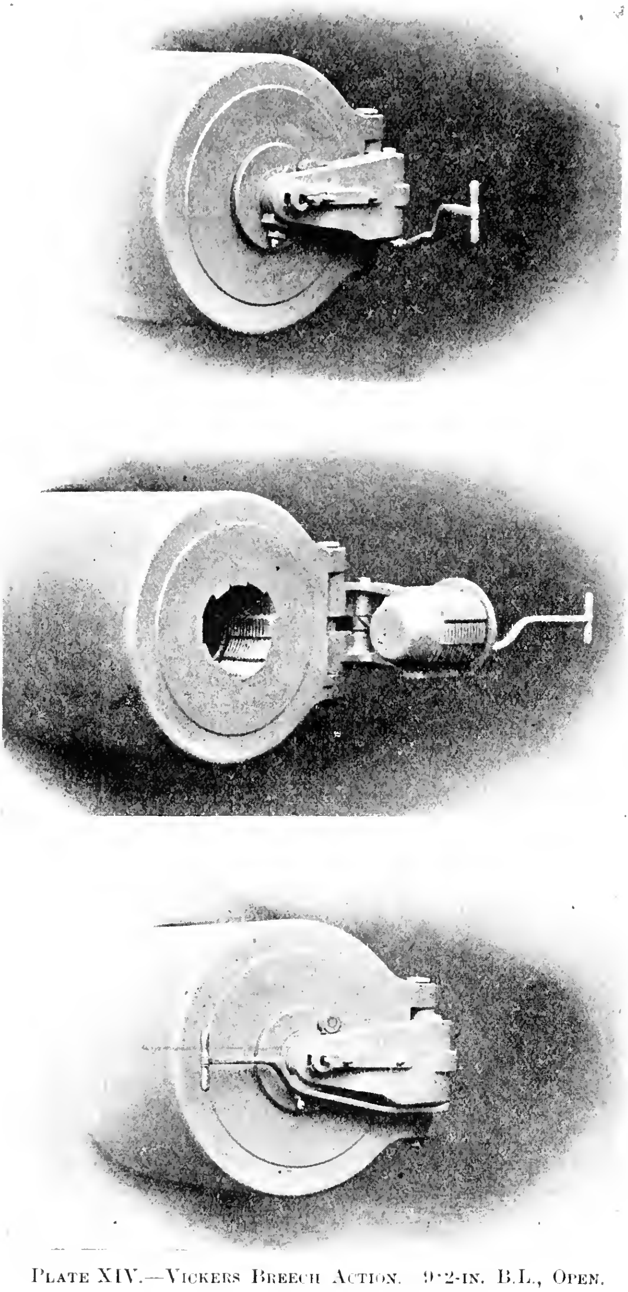


PLATE XIV.—VICKERS BREECH ACTION. 9·2-IN. B.L., OPEN.

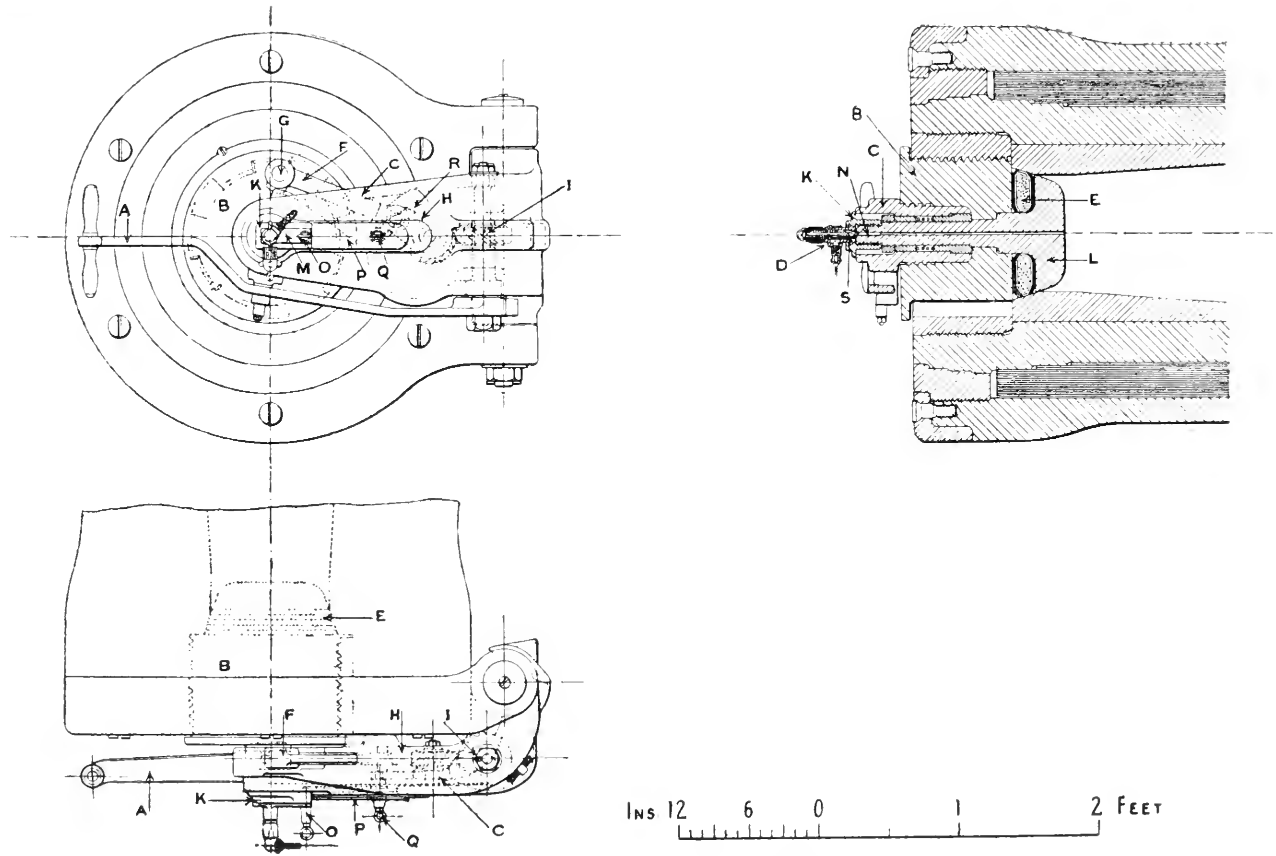


Plate XV.—Vickers Breech Action. 9·2-in. B.L.

7·5-in. gun

Unfortunately, as stated above, a long period must elapse—two years at the very least—before we shall be able to report on the gunnery trials of the first service 7·5-in. gun. Experimental guns of this calibre have given promising results, but this is not the same thing as having the guns mounted for service in their own turret with all ammunition supply arrangements complete. Still, it is not amiss to mention the very high rate of fire attained at Messrs. Vickers's experimental range at Eskmeals with a 50-cal. gun of this calibre. Plate X. shows this gun mounted alongside the 6-in. The far greater size of the 7·5-in. is a noticeable feature, and has stood in the way of its adoption. But the 6-in. is outclassed to such an extent that room must and will be made for the 7·5-in., which at 3000 yds. has 50 per cent. greater penetration. The breech action and loading arrangements are generally similar to those of the 9·2-in. The photograph clearly shows the arrangements of the shot-tray on the cradle. The replenishment of this tray three or four times a minute is the main problem. Unless a herculean man is available, two men are required to lift the 200-lb. projectile and place it in the tray, unless, indeed, the turret admits of this being done by power. Starting with the gun loaded, five rounds were fired at a fixed target 24 ft. × 16 ft. Range, 1100 yds.; all hits; time, 37 sec. If we assume that the first round was fired in three seconds from the order "Commence," this is at the rate of seven rounds per minute. The rate of fire afloat should closely approach that of the 6-in. Q.F., always supposing the turret training and elevating gear to come out satisfactorily.

Accuracy of practice. **Prize-firing.**

For many years after the institution of prize-firing, it was generally thought that the competition was to be between similar guns in the same ship, and not between different ships. The reason is clear that it was considered impossible to institute a fair comparison between ships which fired on different ranges on different days, with all kinds of varying conditions of wind and weather, to say nothing of different types of guns and mountings. On some stations smooth water and calm weather can be counted on; on other stations rough weather and a nasty swell are the rule. There are sometimes so many ships waiting to fire that the practice must needs go on, be the conditions favourable or not. At other times it is possible to wait for a fine day.

Nevertheless, there is no doubt that the competition between similar guns in the same ship did not arouse much interest or enthusiasm. Jack has never shown a mercenary disposition; and had he done so, the prizes were not of sufficient amount to tempt his cupidity. So for some years the regulation prize-firing was regarded

as a formal function which had to be gone through with, and which might possibly interest some few enthusiasts who were mad on guns. For the ordinary Executive officer—the officer of the quarters—or petty officer—captain of the gun—it was one of those aggravating occurrences like the dismounting of guns for examination, or the survey of cables, that in a well-ordered ship come now and again to upset the steady business of getting the ship and ship's company into "thorough good order." All this has completely altered during the last few years. "Gunnery, gunnery, gunnery," says Lord Selborne, is of supreme importance: and in looking about for a test of good gunnery the annual prize-firing at once presents itself as at any rate some indication of efficiency. So it has come about that ships have begun to compete against ships, and on one station, at any rate, under the patronage of the admiral. The commander-in-chief in China has given a challenge shield for the ship which does best, the comparative merit being assessed by an elaborate system of points; and last, but not least, the papers publish results which, although it may not affect the zeal of the captain, commander, or gunnery officer, does certainly incite the crews to greater exertions, and so far is doing good to the service.

Objections to the prize-firing test.

It is urged by some that prize-firing is a very uncertain test of efficiency; that the conditions are far removed from those that will prevail in action. The range is known, only one gun fires at a time, it is all rehearsed beforehand over and over again, and so on. This cannot be denied. But the same may be said of almost any test that human skill can devise. There can be no doubt that the keenness which has arisen over the prize-firing competition, especially in China, is an excellent sign of vitality, and that the ship that excels in prize-firing will also excel in other gunnery tests. Already there are schemes afloat for testing the hitting power of the whole ship rather than that of the individual gun, and we look forward with confidence to a steady advance in this direction. It is a notable fact that the 40 per cent. of hits, which is the average for the China Station, compares most favourably with the average of some years past, which stands at about 30 per cent.

Comments on last year's prize-firing.

In commenting on last year's prize-firing, we labour under the disadvantage that only a portion of the results have been published. Still, it seems probable that we have the best results before us, for otherwise the statements that this ship or the other had established a record would certainly have been contradicted. At any rate, we have a very full report of the result of all the firing on the China Station which appeared in the *Times*.

Taking first the results, obtained with heavy guns mounted in

barbettes, it must be remembered that the target has an oblong centre, 20 ft. long and 15 ft. in height, with two jibs at each end, which extend the water-line to 50 ft. Thus the lower part of the target might represent part of the water-line of a ship, whilst the centre stands for a barbette or turret. But a barbette would measure 32 ft. in breadth and 25 ft. in height, so that its dimensions are 60 per cent. greater than that of the target, and it should be as easy to hit the barbette at 2500 yards as it is to hit the target at 1700. But seeing that hits towards the edges of the barbette would glance off, it would be about as easy to pierce the armour as to hit the prize-firing target. The rapidity with which the bearing and distance alters, whilst the ship steams past the stationary target at 8 knots, is probably very fairly representative of the conditions of firing in a broadside action, which, in our opinion, will be the ordinary fight of the future.

In every case the practice starts with the gun loaded. When the rate of fire is slow, this makes a very material difference. For example, a gun taking nearly 2 min. to load fires the first round in 10 sec. from "Commence," and may get in four rounds in 6 min.—thus: (1) 10 sec.; (2) 2 min. 6 sec.; (3) 4 min. 3 sec.; (4) 6 min.—and be credited with one round in 1 min. 30 sec. in lieu of 1 min. 56 sec., the true time. Of course "Cease Firing" might sound as the gun came to the "Ready," when $1\frac{3}{4}$ min. would be wasted. A fair way of assessing the rate of fire is to take away one round from the total of each gun and deduct from the time for the gun half the average time between two rounds, to allow for waste at the end. Thus the Ocean fired 26 rounds in four runs of 6 min. each.

Deduct 4 rounds from 26 = 22	Result, 1 round per gun per min.
Deduct 2 minutes from 24 = 22	Hits per round, $\frac{14}{26} = 0\cdot54$.
No. of hits = 14	Hits per gun per min = 0·54.

BEST RESULTS WITH HEAVY GUNS.

(Target, 15 ft. high; area, 525 sq. ft.; range, 1400–2000; speed, 8 knots.)

Ship.	Station.	Gun.	Rounds per gun per min.	Hits per gun per min.	Hits per cent.	Weight of metal hitting per min.	Remarks.
						lb.	Guns in double barbettes.
Ocean	China	12″ VIII.	1·0	0·54	54	460	All round loading gear, shell from below.
Mars	Channel	Do.	1·0	0·42	42	357	Auxiliary loading gear (all round) shell from barbette.
Barfleur	China	10″	0·93	0·46	49	230	..
Terrible	China	9·2″ VIII.	1·75	1·12	64	426	Guns in single barbettes.

Best Results with Q.F. Guns.
(Target, 15 ft. high; area, 300 sq. ft.; range, 1400–1600; speed, 12 knots.)

Ship.	Station.	Gun.	Rounds per gun per min.	Hits per gun per min.	Hits per cent.	Weight of metal hitting per min.	Remarks.
						lb.	
Terrible	China	6" Q.F.	5·33	4·25	81	425	..
Ocean	China	Do.	4·80	2·67	56	267	..
Mars	Channel	Do.	4·67	2·58	55	258	..
Barfleur	China	4·7 Q.F.	7·95	5·70	72	256	..

Note.—Average rate of fire and hitting for last three years:—

	Rate of fire.	Rate of hitting.
12" VIII.	0·88	0·27
10"	0·70	0·22
9" VIII.	1·30	..
6" Q.F.	3· 8	1· 1
4·7" Q.F.	5· 3	1· 7

In every case these ships attain their excellence (1) by a rapidity of fire much above the average, (2) by a percentage of hits very much above the average.

There can be no doubt of the pre-eminence of the Terrible (Captain Percy Scott). Her 9·2-in. guns, being on mountings special to her particular type of ship, cannot be compared as regards rate of fire with any other gun, but one round per minute was considered good when these guns were first tried; this has been increased by 75 per cent. The percentage of hits is the highest for heavy guns. With 6-in. Q.F. guns, the Terrible's record of 4·25 hits per minute is as nearly as possible four times the average and stands far above every other ship.

The Barfleur stands a very good second. The rate of fire of both 10-in. and 4·7-in. guns is far above the average, and the rate of hitting of the former more than twice the average, whilst that of the 4·7-in. gun is three times the usual figure.

The Ocean and Mars have done very well. If we look at the hits per minute of the heavy guns, we see that any of them would make exceedingly short work of a rival's barbette, provided they could pierce it. A pair of guns in the Mars and Ocean would pierce a rival's barbette about once a minute at a range of about 2000 yards. The Barfleur would hit as often, but, owing to lack of power, could not pierce. The Terrible's 9·2-in. would deal destruction anywhere in a large armoured cruiser, whilst her 6-in. guns would make short work of the smaller type.

The column showing the weight of metal is remarkable. The little 4·7-in. beats the ponderous 10-in. of ten times its weight. The 6-in., which weighs one-eighth of the 12-in. throws two-thirds as much metal into an enemy. Obviously, if a battle is to be decided by weight of hits, apart from piercing power, the smaller guns are far the best. Therefore, as the heavy guns cannot compete as shell guns, they should go in specially for piercing, and the main supply of projectiles should be armour-piercers.

Careful training tells greatly when Q.F. guns are used.

It is with the Q.F. guns that the highest excellence is attained. In these guns the rate of loading depends in very great measure on the training of the crew, especially in the rapid and skilful handling of the charge and projectile. Captain Scott, in order to train his men in these important matters, has made use of a dummy gun or loading apparatus which enables men to practise the loading in a way not possible with the gun itself. A similar apparatus has now been introduced into other ships. The electric aiming apparatus used in the Terrible also gives excellent practice in laying quickly.

The best gun in the Terrible fired eleven rounds in two minutes, as against 7·6, the average for the service, and made eleven hits, about five times the usual number. Two other guns also hit every time, so that with these wonderfully expert layers it was only a question of rapid loading who should win the prize. The layer is changed after firing for one minute. Five of those who made "highest possibles" took on firing in the middle of the run—always a trying ordeal. No less than ten men in the Terrible hit every time, and six others only missed once. None of the Barfleur's guns hit every time, and there was only one that did not miss twice; but three or four individuals seem to have made highest possibles. The quickest firing was 70 per cent. quicker than the average for the fleet.

Shooting with a Q.F. gun in measure resembles shooting at the running deer or similar targets. The Bisley prize-list shows that the same men win these prizes year after year. The great point is to discover these men and train them up to the required proficiency. It is by no means necessary—and, indeed, in many respects undesirable—that the same man should command and lay the gun; therefore the choice need not be limited to petty officers.

With heavy guns the mechanism does so much of the work that it is impossible to improve the rate of fire to the same extent as with a Q.F. gun. Nor is it possible to continually keep the gun on the move so as to keep the sights on. Still, there is undoubtedly very much to be done in improving the practice with heavy guns, and now that so much interest has been evolved we shall probably see a great improvement.

The question of sighting bears very closely on the improvement of gun practice. A telescope sight was approved some two years ago, and we shall soon be able to judge by an examination of fleet averages whether the practice has been materially improved thereby. A good man will undoubtedly profit by the use of a telescope; an indifferent or stupid man will do better without. There are also atmospheric conditions that do not favour the use of a telescope, and it is absolutely necessary to have the ordinary sights as an alternative. Still, the introduction of a telescope is a step in the right direction and gives additional opportunities for the exercise of careful training. Sighting of guns.

There is one somewhat important matter that seems to have dropped out of view in the fitting of barbette and turret guns. These guns are protected by a heavy hood or turret, which is to safeguard the gun, mounting, and crew from the enemy's fire. But an extremely vulnerable and most important part of the mechanism is quite open to be shot away by the smallest Q.F. gun or the tiniest splinter of a high-explosive shell. We allude to the sights. Not only are the sights outside the barbette hood without any protection, but any fragments of shell glancing along the hood, or even the rush of gas from a melinite shell, will be almost certain to sweep them away. In the same connection our sighting hoods are extremely crude concerns as compared with those fitted to foreign turrets. The high projecting rim or combing should either be made of thick armour or there should be none at all. But, above all, there should be an alternative method of sighting the guns, which should be available after the sights outside the barbette hood have been shot away. The French and Germans make slits in the thick armour, so that the gun can be directed from the inside of the barbette. This may be desirable, too, when it is a question of avoiding the blast of one's own guns firing past the hood. Sights on the guns themselves could be used at moderate ranges, say up to 5000 yards or so, where the angle of elevation would not exceed 3°. Such sights would immensely add to the reliability of the present arrangements, which are not in the least suited for standing a heavy fire. We understand that the Elswick firm have the subject under consideration. In these days of prismatic telescopes, there should be no difficulty in having nothing above the roof of the barbette save the end of the telescope, which would pass through a small hole in the roof, all the sighting gear being inside. **Protection to turret and barbette sights.**

BRITISH RIFLED ORDNANCE.

(Compiled from the official "List of Service Ordnance, 1898," and supplemented by subsequent information.)

Calibre or Pr.	Ordnance. Nature. Weight.	Nature. Mark and Service.*	Total length in inches.	Length of Bore, including Chamber.	Chamber. Diameter (at largest).	Chamber. Length to base of projectile.	Rifling. Twist one turn in Least at breech.	Rifling. Twist one turn in Greatest at muzzle.	System.†	Charge (full). Weight.‡	Charge (cordite). Weight.	Charge (cordite). Size.	Projectile. Diameter.	Projectile. Weight.	Bursting Charge of Common Shell.	Value of $\frac{d^2}{w}$.	Value of $\frac{w}{d^3}$.	Muzzle velocity.	Ballistics (with full charges). Total muzzle energy.	Muzzle energy per ton of gun.	Perforation of wrought iron. At muzzle.	At 1000 yards range.	At 2000 yards range.	At 3000 yards range.
B.L. GUNS.				cals.	ins.	ins.	cals.	cals.		lbs.	lbs. oz.		ins.	lbs.	lbs. oz.			f. s.	ft. tons.	ft. tons	ins.	ins.	ins.	ins.
16·25-in.	110½ tons.	I. II. & III.	524·0	30·0	21·125	84·5	newer patterns.	30	Modified Pl. Section, the last in the new guns.	960 S.B.C.	..	..	16·25	1800	‡‡193 **179¼	0·147	0·420	2087	54,390	492	38·0	34 6	31·7	29·4
13·5-in.	69 & 67 tons.	I. II. III. & IV.	433·0	30·0	18·0	66·5		30		630 S.B.C.	18 7½	..	13·5	1250	**85	0·146	0·508	2016	35,230	511 526	33·0	30·2	27·6	25·2
12-in.	45 & 46 tons.	III. IV. V. & V.w	328·5	25·25	16·0	48·0		35		295 P.Br.	88 8	30	12·0	714	31 13/16 ‡‡95 **79	0·202	0·413	1914	18,130	403 394	24·4	21·5	18·9	16·1
12-in.	46 tons.	VIII. Wire	445·5	35·43	16·0	70·0		30		..	167 8	50	12·0	850	80–1 9/11	0·169	0·492	2367	33,020	718	36·8	32·7	29·4	26·6
12-in.	50 tons.	IX. Wire	496·5	40·0	17.5	87·2		..		..	201 8 9 8	50 3¾	12·0	850	„			2481 *a*	36,290	726	39·7	35·4	31·6	28·7
10-in.	29 tons.	II. III. III.A & IV.	342·4	32·0	14·0	54·0		30		252 P.Br.	76 0	30	10·0	500	37¾	0·200	0·500	2040	14,430	498	24·8	21·8	19·3	17·0
9·2-in.	21 & 22 tons.	I. & II.	255·8	25·56	11·0	44·0		35		140 P.Br.	42 0	30	9·2	380	18	0·223	0·488	1781	8,356	411 392	18·3	15·9	14·4	12·4
9·2-in.	24 & 22 tons.	III. V. VI. VI.A&C & VII.	310·0	31·5	12·0	43·0		30		161 P.Br.	53 8	30	9·2	380	‡‡33 **30 6/16	0·223	0·488	2065	10,910	455 496	22·9	19·8	17·2	15·5
9·2-in.	25 tons.	Wire VIII.	384·0	40 08	10·5	53·15		..		..	63 0	40	9·2	380	..	0·223	0·488	2347	14,520	581	27·6	23·9	20·7	18·0
9·2-in.	27 tons.	Wire IX.	445·25	46·74	13·0	71·215		..		..	103 0	44	9·2	380	..	0·223	0·488	2640	18,400	681	33·3	28·9	25·0	22·0

8-in.	14 tons.	III.	222·5	25·1	10·5	34·5	Various in the	35	P. Elswick, Hook, or	104 P.Br.	28	12	20	8·0	210	$13\frac{10}{16}$	0·305	0·410	1953	5,554	427 397	16·8	13·8	9·5	8·0
8-in. 8-in.	15 tons. 14 tons.	IV. VI.	254·5	29·61	10·5	38		35 30		118 P.Br.	32	10	20	8·0	210	‡‡29 ‡‡$18\frac{1}{2}$	0·305	0·410	2150 2200	6,730 7,046	449 503	19·3 20·0	16·0 16·6	13·2 13·7	10·8 11·3
6-in.§	5 tons.	III.	170·7	25·53	8·0	26·75		35		36 E.X.E. 48 E.X.E.	14	12	20	6·0	100	$7\frac{4}{16}$ **$9\frac{13}{16}$	0·360	0·463	1960	2,665	533	13·4	10·7	8·9	7·0
6-in.§	5 tons.	IV. VI.	173·5	26·0	8·0	26·75		35 30		48 E.X.E.				6·0											
5-in.	38 cwt. 40 cwt.	II. III. IV. & V.	139·15	25·07 25·0	5·75	19·05		25		15·5 S.P.	4	$7\frac{1}{4}$	7·5	5·0	50	$7\frac{12}{16}$ $3\frac{5}{16}$	0·500	0·400	1750	1,062	559 531	8·8	6·6	5·3	4·1
4-in.	23 cwt. 26 cwt.	II.II$_A$.III.III$_A$ IV.V.& VI.	120·0	27·0	5·3	18·5	120	30		12 S.P.	3	1	5	4·0	25	$1\frac{12}{16}$ $3\frac{3}{16}$	0·640	0·391	1900	625	544 481	7·7	5·4	4·0	3·0
12-pr.(3·0)	6 cwt.	Wire I. (L.)	66·75	19·66	3·2	8·35	105	28		..	0	$12\frac{7}{16}$	5	3·0	‖12·5	..	0·720	0·463	1553	209	697	..	..	..	..
M.L. GUNS.																									
16-in.	80 tons.	I.	321·0	18·0	18·0	59·6	0	50	P.Pl.	450 Pr.[1] Br	..		..	16·0	1700 0	$75\frac{6}{16}$ $112\frac{8}{16}$	0·151	0·415	1540	27,960	350	24·3	22·5	20·9	..
12·5-in.	38 tons.	I.	230·0	15·84	Unchambered		0	35	W.	130 Pr.[2] or 165 Pr.[1] Bl															
12·5-in.	38 tons.	II.	222·8	15·84	14·0	41·125	438	35	W.	200 E.X.E 210 Pr.[2] or 190 Pr.[1] Bl	..		..	12·5	818·0	$37\frac{8}{16}$	0·191	0·419	1442 1575	11,820 14,070	311 371	17·4 19·5	16·0 17·8	14·7 16·3	.. ..
12-in.	25 tons.	II.	182·5	12·09	Unchambered		100	50	W.	85 Pb.[2]	..		..	12·0	614·0	$28\frac{2}{16}$ $61\frac{10}{12}$	0·235	0·355	1292	7,109	288	13·4	12·1	11·0	..
11-in.	25 tons.	II.	180·0	13·18	,,		0	35	W	85 Pb.	..		..	11·0	548·0	27	0·221	0·411	1360	7,028	281	14·2	12 9	11·7	..
10-in.	18 tons.	II.	180·0	14·55	,,		100	40	W	70 Pb.	..		..	10·0	410·0	$23\frac{1}{2}$	0·244	0·410	1379	5,408	300	13·1	11·7	10·5	..
9-in.	12 tons.	V.	156·0	13·89	,,		0	45	W.	50 Pb.	13	4	$7\frac{1}{2}$	9·0	256·0	17	0·316	0·351	1440	3,681	307	11·4	9·8	8·5	..

* The Roman numeral is the number of the pattern given. Further differences in pattern are indicated by letters a, b, and c.

† P. means Polygroove; Pl., Plain; W., Woolwich; F., French; F.M., French modified; H., Henry; E.O.C., Elswick Ordnance Co.

‡ S.B.C. (in column for charge) means Slow-burning Cocoa; P.Bl. stands for Prismatic Black; P.Br. for Prismatic Brown; Pb., Pebble; R.L.G., Rifle Large Grain; L.G., Large Grain; E.X.E., Experimental letter E.

§ For 6-in. (VII.) *see* Q.F. table. ‖ Shrapnel. ** Cast steel. ‡‡ Forged steel. *a* At 60° Fahr. At 80°, V. = 2526 f.s. E. = 37,600 ft. tons. Perftn. = 40·6 in.

BRITISH RIFLED ORDNANCE—*continued.*

(Compiled from the official "List of Service Ordnance, 1898." Supplemented by subsequent information.)

Ordnance. Nature. Calibre or Pr.	Nature. Weight.	Nature. Mark and Service.	Total length in inches.	Length of Bore, including Chamber.	Chamber. Diameter.	Chamber. Length to base of projectile.	Rifling. Twist one turn in Least at breech.	Rifling. Twist one turn in Greatest at muzzle.	Rifling. System.*	Charge (full). Weight.	Charge (cordite). Weight.	Charge (cordite). Size.	Projectile. Diameter.	Projectile. Weight.	Projectile. Bursting Charge of Common Shell.	Projectile. Value of $\frac{d^2}{w}$.	Projectile. Value of $\frac{w}{d^3}$.	Muzzle velocity.	Ballistics (with full charges). Total muzzle energy.	Muzzle energy per ton of gun.	Perforation of wrought iron. At muzzle.	At 1000 yards range.	At 2000 yards range.	At 3000 yards range.
QUICK-FIRING GUNS				cals.	ins.	ins.	cals.	cals.		lbs.	lbs. ozs.		ins.	lbs.	lbs.			f. s.	ft. tons.	ft. tons.	ins.	ins.	ins.	ins.
7·5 in.	14 tons	..	329	45	..	..	..	..	..	..	..	..	...	200·0	..	0·281	0·474	2700	10,120	723	27·4	23·0	19·3	16·2
6·0 in.	7 tons	I. & III. II. (Wire)	249·25	40	..	..	60	30	P.	..	13 4	30	..	100·0	..	0·360	0·463	2200	3356	479	15·9	12·7	10·2	..
6·0 in. converted ..	5 "	I. to VI.	169·1	26·2	..	..	..	..										1913	2537	362	13·0	10·3	8·2	..
			166·6	26·6	..	..	..	..																
6·0 in. (Vickers) § ..	$7\frac{8}{20}$ tons	"BL. VII."	..	45	..	..	..	..	..	..	..	..	..	100·0	..	0·360	0·463	2642	‡4840	654	21·0	16·7	13·4	..
4·7 in.	41 cwt. 42 "	I. II. III. & IV. Wire	194·1	40	..	...	100 0	31·4 30	E.O.C.	..	5 7	20	4·72	45·0	..	0·495	0·428	2188	1494	711	12·4	9·2	6·6	..
4 in.	26 cwt.	I. II. III. Wire	165·25	40	..	..	..	30	M.Pl.	..	3 9	15	..	25·0	..	0·640	0·390	2300	917	705	10.5	6·9	4·9	..
		converted guns	120	28														2177	821	569	9·5	6.5	4.6	..
12-pr.	12 cwt.	I.	123·6	40	..	..	120 0	28 30	E.O.C. M.Pl.	..	1 15	10	3·0	12·5	..	0·667	0·500	2210	423	677	8·1	5·3	3·5	..
12-pr.	8 cwt.	I.	87·6	28	..	..	60 0	28 30	E.O.C. M.Pl.	..	13¾	10	3·0	12·5	..	0·667	0·500	1607	223·8	544	4·9	3·2	2·4	..
Hotchkiss . 6-pr...	8 cwt.	I. & II.	97·63	40·0	..	..	180	29·9	M.Pl.	..	b7¾	5	2·24	6·0	..	0·836	0·534	1818	137·5	344·8	4·8	2·8	..	..
Nordenfelt . 6-pr...	6 cwt.	I. II. & III.	104·4	42·3	..	..																		
Hotchkiss . 3-pr...	5 cwt.	I. & II.	80·63	40	..	..	25	25	M.Pl.	..	b6⅜	5	1·85	3·3	..	1·037	0·521	1873	80·3	321·2	4·1	2·1	.	..
Nordenfelt . 3-pr...	4 cwt.	I. L.	91·5	45·4									..	..	..	..	..	1920	84·3	337·2	4.3	2·2	..	..
MACHINE GUNS.										grains.				oz. grs.										
Nordenfelt, 2 bar 1-in.	180 lbs.	I.	52		..	..	35	35	H.	625 M.G.	..	..	1·0	7¼ 0	..	2·207	0·453	..	..	..	¾-in. at 200 yards.			
" 4 bar 1-in.	447 lbs.	III.†	57·0		..	..	35	35	H.															
" 5 bar 0·45-in.	160 lbs.	I. G. G.	46·0		..	..	22	22	H.															
	143 lbs.	II. G. G.	42·25		..	..	22	22	H.															
Gardner, 1 bar 0·45-in.	76 lbs.	I. G. G.	47·0		..	..	22	22	H.	85 R.F.G₂.	..	..	0·450	480	..	2·952	0·751	..	..	..	Same as MH. Rifle, which perforates ⅛ in. wrought iron plate at 600 yds., $\frac{3}{16}$ in. at 400 yds., ¼ in. at 100 yds.			
" 2 bar 0·45-in.	120 lbs.	I. G. G.	47·0		..	..	22	22	H.															
" 5 bar 0·45 in.	268 lbs.	I. G. G.	53·5		..	..	22	22	H.															
Maxim, 1 bar 0·45 in.	63 lbs.	I. G. G.	43·75		..	..	22	22	H.	31 Cordite	..	..	0·450	480	..	2·952	0·751	..	..	..	Same as MH. Rifle.			
			45·0				10	27	Enfi'ld															
Maxim, ·303			42·38				10	25·6	Metf'd				0·303	215	..	..	..	..	..	..	Same as Lee-Metford.			

* P. means Polygroove; M.Pl., Modified plain; W., Woolwich; F., French; F.M., French modified; H., Henry; E.X.E., Experimental letter E.

† I. and II. differ chiefly in being 7 lbs. lighter; I. has a pitch of rifling of 1 in 60 in.; G.G., Gardner Gatling; H., Henry. b With 4 drs. R.F.G. ‡ With a new gun at Portsmouth and must be regarded as the maximum effect.

§ This gun has no metal cartridge. *Note.*—An armour-piercing shell has now come in for the 6-in. guns.

AUSTRIAN NAVAL ORDNANCE

AUSTRIAN NAVAL ORDNANCE.

		Krupp Steel B.L. & Q.F. Guns.									
Designation by Calibre, in centimètres		30·5 L. 35 C. 80	24 cm. L. 40 C. 94	24 L. 35 C. 86	24 L. 22	15 L. 40 C. 94	15 L. 35 C. 86	15 L. 35 C. 80	12 L. 40	12 L. 35 C. 80	12 L. 35 C. 87
Calibre, in inches		12·01	9·45	9·45	9·27	5·87	5·87	5·87	4·72	4·72	4·72
Length	Total, in feet	35·11	..	27·60	17·16	..	17·13	17·13	..	13·8	13·8
	Rifled Portion, in ins.	314·8	..	237·7	135·9	..	151·4	153·6	..	128·5	126·3
	Powder Chamber ,,	69·9	..	65·2	41·7	..	37·3	35·4	..	24·0	26·3
	Of bore in calibres	35	37·4	35	22·0	37·0	35	35·0	37	35·0	35
No. of Grooves		68	..	25	32	..	36	36	..	32	32
Twist in calibres		45·25	..	26·9	70	..	45–25	25	..	25	25
Weight	Gun, tons	47·2	27·8	26·6	14·5	4·39	5·7	4·69	1·97	2·25	2·31
	Breech Block, in lbs.	3306·9	..	1776·9	1422	..	445·3	463·0	..	253·5	211·6
	Steel Shell ,,	1003·1	474	474·0	292·1	100	112·5	86·0	52·4	57·3	57·3
	Common Shell ,,	1003·1	474	474·0	263·5	100	112·5	69·9	52·4	57·3	57·3
	Shrapnel Shell ,,	..	..	..	..	..	112·4	71·9	..	57·3	57·3
	Case Shot ,,	..	..	..	..	..	..	..	..	..	..
Weight of Bursting Charge	Steel Shell ,,	10·6	..	5·1	6·6	..	1·3	1·76	..	0·55	0·55
	Common Shell ,,	97·7	..	17·9	15·0	..	5·29	3·86	..	2 2	2·2
	Shrapnel Shell ,,	..	..	..	..	..	1·26	1·10	..	0·57	0·57
Weight of Firing Charge	Steel Projectile, in lbs.	156·5 24 cm.N	91·5	99·2N	76·1 B	18·3	22·5 15 cm.N	38·8*	9·7	19·8 B	12·13N
	Common Shell, in lbs.	156·5 N 24 cm.N	91·5	99·2N	44·1	18·3	22·5 15 cm.N	38·8*		19·8 B	12·13N
	Shrapnel, in lbs.	..	..	..	..	..	..	..	..	..	..
	Exercising, in lbs.	154·3B	..	..	44·1	..	28·7	19·6	..	11·0	6·6 N
	Saluting ,,	19·8 O	..	15·4O	15·4 O	..	4·74	4·74 O	..	2·4 O	2·4 O
Muzzle Velocity, in feet		1969	2264	2100	1587	2264	2133	1969	2261	1755	2133
Muzzle Energy	Total, foot-tons	26,970		14,500	5104		3549	2312	3554	1215	1808
	Per inch circumference, foot-tons	714·8	16,845	488·3	175·3	3554	192·5	125·4	..	82·5	122·2
Thickness of Iron, perforated inches at Muzzle		28·0	..	27·4†	13·7	..	14·5§	11·7§	..	9·4‡	11·6‡
Ditto by Tresidder's formula		30·1	29·0	25·8	13·4	17·0	16·1	12·6	13·7	9·7	12·9

NOTE.—C for cube powder; * prismatic powder; O, ordinary powder; B, brown prismatic. N, nitro-glycerine smokeless powder.
† By Krupp's formula. ‡ By Fairbairn's formula.
There are also Q.F. Skoda 7 cm., Skoda and Hotchkiss 47 mm., another 47 mm. and Hotchkiss 37 mm.
It is believed that guns with at least 2500 M.V. are under construction.

DANISH NAVAL ORDNANCE.

	Krupp B.L. Guns designated.													
Designation by Calibre	35·5 cm.	30·5 cm.	26 cm. long.	26 cm. short.	24 cm.	24 cm.	21 cm.	15 cm.	15 cm. long.	15 cm. medium.	15 cm. short.	12 cm. long.	12 cm.	8·7 cm.
Calibre, in inches	13·98	12·01	10·24	10·24	9·4	9·4	8·24	5·9	5·91	5·91	5·91	4·72	4·7	3·43
Total length, in feet	29·1	22·0	32·8	18·77	31·4	31·6	24·04	..	17·1	12·63	10·7	11·8	..	11·5
Length of Bore, including Powder Chamber, in inches	304·7	227·2	327·6	194·5	..	..	264·5	..	190·3	135·0	112·9	128·8	..	..
Length of Bore, including Powder Chamber, in calibres	21·8	18·9	32·0	19·0	37	37·5	35	40	32·2	22·8	19·1	27·3	37·5	37·1
Number of Grooves	80	68	60	60	..	..	48	..	36	36	36	32	..	..
Twist of Rifling, in calibres	45	45	70–25	45	..	..	70–25	..	70–25	45	45	25	..	..
Total weight, including Breech-gear, tons	51·3	35·4	27·6	21·6	25·4	22·9	13·3	..	4·7	4·4	3·5	2·13	..	..
Weight of Breech Block, lbs.	4695·8	2910	2006	1940	..	..	903·9	..	390·2	330·7	324·1	229·2	..	..
Weight of Steel Shell, "	1157·4	725·3	451·9	451·9	353	353	238·1	112	112·4	..	86·0	..	44	..
Weight of Chilled Shell, "	1157·4	725·3	..	451·9	..	..	..	..	..	86·0	86·0	..	..	..
Weight of Common Shell, "	1157·4	725·3	451·9	451·9	230	353	238·1	112	112·4	69·4	69·4	57·3	44	20
Weight of Shrapnel Shell, "	1157·4	725·3	451·9	451·9	..	..	238·1	..	112·4	86·0	86·0	57·3	..	..
Weight of Case Shot, "	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Weight of Bursting Charge, Common Shell, "	57·3	39·7	25·4	25·4	16·5	16·5	12·8	6·2	6·2	3·0	3·0	1·7	..	..
Weight of Firing Charge, Steel or Chilled Shell, lbs.	330·7	180·2	191·8	101·4	..	75*	105·8	20·9*	41·9	19·3	21·8	17·4	9·7*	3·59*
Weight of Firing Charge, Common Shell, "	330·7	180·2	191·8	112·4	..	75*	105·8	..	41·9	19·3	21·8	17·4	..	..
Muzzle Velocity, Armour-piercing Projectile, feet	1762	1675	2018	1640	2159	2362	2021	2264	1800	1565	1542	..	2460	2379
Muzzle Velocity, Common Shell, "	1762	1675	2018	1640	..	..	2021	..	1890	1683	1690	1720	..	..
Muzzle Energy, Total foot-tons	24910	14110	12770	8428	11,440	13,656	6745	3981	2784	1461	1418	..	1846	780
Muzzle Energy, Per inch circumference, foot-tons	568·3	374·1	396·8	262·0	..	..	260·6	..	150·0	78·7	73·0	..	..	..
Perforation at Muzzle, in ins., by Fairbairn's form.	24·8	20·0	20·1	16·7	..	..	16·9	..	12·8	9·1	8·8	..	..	..
ditto ditto Tresidder's form.	25·6	20·1	22·9	16·8	23·3	26·7	18·5	17·8	15·6	12·6	..	..	14·2	10·7

NOTE.—Chilled projectiles will gradually be replaced by steel.

There is also a 44-calibre 5-pr. Hotchkiss, V. = 2362 f.s.

* Smokeless powder.

DUTCH NAVAL ORDNANCE.

	Krupp Breech Loading Q.F.													Dutch Breech Loading.		
Designation by Calibre, in centimètres	28	24	21	21	21	17	15 No. 1.	No. 2.	15	15	12	12	12	12 No. 2.	12*l*	7·5
Calibre, in inches	11·02	9·4	7·91	8·2	8·2	6·80	5·87	5 87	5·9	5·9	4 7	4·7	4·72	4·72	4·72	2·95
Total Length, in feet	20·01	31·6	24·04	24·0	27·5	13·94	12·63	17·13	17·1	19·7	13·9	15·9	13·78	6·89	13·78	7·87
Length of Rifled Portion of Bore, in inches	170·8	..	222·2	..	..	112·7	111·8	151·4	..	..	..	..	128·5	61·4	..	43·2
Length of Powder Chamber "	36·4	..	42·4	..	..	36·0	23·2	37·7	..	..	..	..	24·0	13·0	..	6·7
Length of Bore, in Calibres	18·8	37	35	32	37·1	21·9	23·0	35	32	37	32 3	37·3	35	15·8	35	17·5
Number of Grooves	64	..	48/64	..	..	42	36	44	..	..	..	..	32	12	32	20
Depth of Grooves, inches	0·069	..	0·059	..	..	0·118	0·118	..	..	..	..	..	..	0·118	0·06	0·049
Twist of Rifling in Calibres	45	..	∝ 25	..	..	45	40	25	..	..	..	..	25	40	∝ 45	∝ 30
Total Weight, in tons	27·21	25·3	12·79 / 13·98	14·0	16·2	5·51	3·94	4·72	3·8	4·7	1·9	2·7	2·26	0·93	2·31	0·21
Firing Charge: Armour-piercing Projectile, in lbs.	121·3	..	99·2	119	..	27·6	20·9	49·6	15·4	18·5	..	..	19·8	..	19·5	..
Firing Charge: Common Shell "	121·3	..	99·2	..	..	27·6	20·9	49·6	..	..	..	..	19·8	2·43	19·8	0·82
Weight: Armour-piercing Projectile "	560·0	471	308·6	309	309	132·3	86·0	112·2	100	88·2	52·4	57·4	57·3	..	57·3	..
Weight: Common Shell "	476·2	..	308·6	..	..	112·4	69·4	112·2	..	..	..	..	57·3	29·5	57·3	9·5
Weight: Case Shot "	273·4	..	..	..	..	63·9	41·9	..	..	..	..	..	57·3	26·5	..	9·3
Bursting Charge: Armour-piercing Projectile "	6·6	..	4·6	..	..	2·2	1·1	..	..	..	..	..	..	..	..	..
Bursting Charge: Common Shell "	26·5	..	12·3	..	..	6·6	6·6	..	..	..	..	..	..	1·8	..	0·44
Muzzle Velocity, feet	1558	2067	1739	1903	2067	1558	1558	2001	2034	2461	2034	2067	1755	951	1804	958
Muzzle Energy: Total, in foot-tons	9423	14,050	6471	7,760	9,756	2226	1447	3115	2867	3703	1503	1689	1224	..	1264	..
Muzzle Energy: Per inch Circumference, foot-tons	272	..	260·7	..	..	104	84	169·0	..	..	..	..	82·5	..	85·2	..
Perforation at Muzzle, in inches	17·0	25·3	16·8 / 17·1	19·4	21·9	10·5	9·1	13·6 / 14·8	14·3	17·9	11·6	12·4	9·4 / 10·1	..	9·6	..
Metal employed or system of construction	Steel Jacket and Hoops.			Steel-hooped.				Steel Jacket and Hoops.	Steel-hooped.				Steel Jacket and Hoops.	Bronze.		

FRENCH NAVAL ORDNANCE.

Date and Pattern of Gun.	Model 1893–96.				Model 1893.				
Desig. by Calibre, in cms.	30·5	27·41	24·0	19·4	34·0	30·5	27·44	24·0	19·4
Calibre, in inches	12·01	10·8	9·45	7·64	13·39	12·0	10·8	9·45	7 64
Total length, in feet	..	..	..	..	..	..	..	..	..
Length of Bore, in ins.	..	..	..	..	..	..	..	..	..
Length of Bore, in cals.	45	45	40	40	35	40	45	40	40
Number of Grooves	..	..	..	..	..	..	..	..	..
Depth of Grooves, inches	..	..	..	..	..	..	..	..	..
Rifling Twist	..	..	..	..	..	..	..	..	..
Total weight, in tons	..	..	..	..	52·9	45·9	34·9	22·4	10·6
Weight of Firing Charge: Armour-piercing Projectile lbs.	..	..	..	..	243·0	198·4	114·6	110·2	44·1
Weight of Firing Charge: Com. Shell lbs.	..	..	..	..	..	..	..	..	..
Weight: Armour-piercing Projectile* lbs.	644	476	317	165	925·9	643·8	476·2	317·5	165·3
Weight: Com. Shell "	..	..	..	..	..	..	..	..	..
Weight: Case Shot "	..	..	..	..	..	..	..	..	..
Muzzle Velocity, in f.-s.	2870	2870	2870	2870	2100	2625	2625	2625	2625
Muzzle Energy: Total, in f.-t.	36782	27186	18105	9421	36850	30750	22750	15170	7898
Muzzle Energy: Per in. circ., f.-t.	..	..	..	..	..	815·8	670·7	511·1	329·1
Perforation at Muzzle, wrought iron, inches	42·7†	38·8†	33·8†	27·1†	36·8†	37·3†	33·7†	29·4†	13·4†
" " "	..	..	..	..	..	..	..	..	..

Date and Pattern of Gun.	Model 1887.				1870-81	70–81. 70–84.	1884.				
Desig. by Calibre, in cms.	34	30·5	27	19	27	32	34	27	24	16	14
Calibre, in inches	13·39	12·0	10 80	7·64	10·80	12·6	13·39	10·80	9·45	6·49	5·45
Total length, in feet	..	..	..	..	23·97	27·93	..	28·47	24·89	17·04	..
Length of Bore, in ins.	..	..	..	..	269·0	313·8	..	..	..	..	..
Length of Bore, in cals.	42	45	45	45	25	25	30	30	30	30	30
Number of Grooves	..	..	..	..	..	..	..	..	..	..	..
Depth of Grooves, inches	..	..	..	..	0·059	0·059	..	..	..	..	..
Rifling Twist	..	..	..	..	7°	7°	..	..	..	..	..
Total weight, in tons	60·0	49·2	37·1	10·6	24·6	42·3	50·8	27·7	17·9	5·4	3·15
Weight of Firing Charge: Armour-piercing Projectile lbs.	220·5	198·4	114·6	44·1	154·3	282·2 / 249·1	388·0	200·6	..	42·5	..
Weight of Firing Charge: Com. Shell lbs.	..	..	..	..	154·3	282·2 / 249·1	..	200·6	..	42·5	27·1
Weight: Armour-piercing Projectile* lbs.	925·9	613·8	476·2	165·3	476·2	760·6	925·9	476·2	317·5	99·2	..
Weight: Com. Shell "	..	..	..	..	396·8	630·5	771·6	396·8	264·6	99·2	66·1
Weight: Case Shot "	..	..	..	..	..	..	..	..	..	..	..
Muzzle Velocity, in f.-s.	2560	2625	2625	2625	1887	1985 / 1804	1969	1969	1969	1969	1969
Muzzle Energy: Total, in f.-t.	42040	30750	22750	7898	11760	20780 / 17160	24900	12800	8539	2668	1777
Muzzle Energy: Per in. circ., f.-t.	..	815 8	670·7	329·1	346·6	525·0 / 433·5	591·9	377·5	287·7	130·8	103·9
Perforation at Muzzle, wrought iron, inches	40·8†	37·3†	33·7†	23·7†	20·6†	26·1† / 22·6†	27·6†	22·0†	19·2†	13·0†	10·7†
" " "	..	..	..	..	..	..	26·6‡	21·1‡	18·4‡	12·4‡	..

Date and Pattern of Gun.	1881.						
Desig. by Calibre, in cms.	34 long.	34 short.	27	24	16 heavy.	16 light.	14
Calibre, in inches	13·39	13·39	10·8	9·45	6·49	6·49	5·46
Total length, in feet	33·69	25·32	27·12	23·70	15·14	15·14	14·3
Length of Bore, in ins.	380·6	280·2	306 9	269·3	180·9	180·9	162·6
Length of Bore, in cals.	28·5	21·0	28·5	28·5	28	28	28
Number of Grooves	..	..	..	..	50	50	42
Depth of Grooves, inches	0·067	0·067	0·059	0·055	0·039	0·039	0·035
Rifling Twist	7°	7°	7°	7°	7°	7°	7°
Total weight, in tons	52·2	47·2	27·4	17·7	4·9	3·9	3·2
Weight of Firing Charge: Armour-piercing Projectile lbs.	388·0	337·3	203·9	149·9	42·5	32·6	..
Weight of Firing Charge: Com. Shell lbs.	337·3	368·2	203·9	149·9	42·5	32·6	27·1
Weight: Armour-piercing Projectile* lbs.	925·9	925·9	476·2	317·5	99·2	99·2	..
Weight: Com. Shell "	771·6	771·6	396·8	264·6	99·2	99·2	66·1
Weight: Case Shot "	..	..	..	..	130·7	130·7	61·7
Muzzle Velocity, in f.-s.	1 9	1804	1969	1969	1969	1821	1936
Muzzle Energy: Total, in f.-t.	24900	20880	12800	8539	2668	2080	..
Muzzle Energy: Per in. circ., f.-t.	591·9	496·6	377·5	287·7	130·9	121·3	..
Perforation at Muzzle, wrought iron, inches	27·6†	24·2†	22·0†	19·2†	13·0†	11·6†	..
" " "	26·6‡	..	21·1‡	18·4‡	..	..	..

* Steel or chilled iron. † By Tresidder's formula. ‡ By Krupp's formula.

FRENCH NAVAL ORDNANCE—*continued.*

Date and Pattern of Gun.	75–79.	Jacketed. 1870.		Jacketed. 75	Jacketed. 75	1875.				Q.-F. Guns. *164·7	16§	16‡	14§	14	Mod. 92. 10	Mod. 91. 10	Mod. 81. 10‡
Desig. by Calibre, in cms.	37	27	14	27 No. 1	10	42†	34	27 No. 1	10		16·47		13·86			10·00	
Calibre, in inches	14·57	10·79	5·46	10·8	3·91	16·54	13·39	10·8	3·91		6·46		5·41			3·94	
Total length, in feet	36·7	17·7	10·3	19·3	9·3	32·5	22	19·3	9·3								
Length of Bore, in inches	414·0	194·3	115·0	213·4	104·3	366·0	241·5	213·4	104·3								
Length of Bore, in calibres	28·5	18	21	19·7	26	22	18	19·8	26	45	45	30	45	30	60	50	26
Number of Grooves	..	54	28	54	20	84	68	54	20								
Depth of Grooves, inches	0·079	0·059	0·047	0·059	0·032	0·079	0·059	0·059	0·032								
Rifling Twist	7°	4°	4°	4°	7°	7°	4°	4°	7°								
Total weight, in tons	**75·1	22·8	2·6	27·9	1·18	74·8	47·6	27·6	1·18		6·89	4·92	4·13	3·84	2·19	1·62	1·18
Weight of Firing Charge: Armour-piercing Projectile * (lbs.)	463	136·7	..	165·3	..	604·1	304·2	136·7	..	44	30·2	19·0	16·1	12.8	8·16	8·16	5·07
Weight of Firing Charge: Common Shell ,,	463	126·8	11·2	145·5	10·1	..	231·5	121·3	7·1								
Weight: Armour-piercing Projectile (lbs.)	1235	476·2	..	476·2	..	1719·6	925·9	476·2	..	115	99·21		66·14			30·87	
Weight: Common Shell ,,	1014	396·8	61.7	396·8	30·9	1433·0	771·6	396·8	26·3								
Weight: Case Shot ,,	..	321·9	42·8	321·9	18·7	..	..	321·9	18·7								
Muzzle Velocity, in ft.-sec.	1969	1608	1529	1640	1673	1663	1722	1641	1591	2870	§2625	2100	2625	2100	2500	2428	1840
Muzzle Energy: Total, in foot-tons	33210	8515	..	8880	..	17750	19160	8865	..	6568	4730	3061	3160	2022	1340	1266	725
Muzzle Energy: Per in. circ., foot-tons	725·4	251	..	261·7	..	422	456	261	..	..	233·5	150·9	184·9	118·7	..	..	..
Perforation at Muzzle, wrought iron, inches	30·5†	16·2†	..	16·7†	..	26·3†	22·6†	16·7†	..	24·5†	20·0†	14·4†	17·7†	12·7†	13·0†	12·5†	8·2†

* Steel or chilled iron. ** Made at St. Chamond. The Creusôt gun weighs 71·4 tons. † By Tresidder's formula.
‡ Models 1881 and 1884 converted guns. § There are three models of the years 1887, 1891 and 1893, of slightly different weights from the above.

GERMAN NAVAL ORDNANCE.

	Krupp Steel Breech-loading Guns, designated by calibre.																			Bronze B.L.	
Designation in centimètres	30·5 jack'd.	28	28	26 long.	26 jack'd.	26 short.	24 Q.F.	24 long.	24 long.	21 Q.F.	15 Q.F.	15 Q.F.	15 long.	10·5 Q.F.	10·5 Q.F.	12·5 hoop'd.	10·5 long.	8·7	6	8	8·8
Calibre, in inches	12·01	11·02	11·02	10·33	10·33	10·33	9·45	9·45	9·45	8·2	5·9	5·9	5·87	4·13	4·13	4·92	3·96	3·43	2·36	3·19	3·42
Length: Total, in feet	21·98	36·75	32 15	18·77	18·77	17·06	31·50	27·56	23·63	27·4	17·6	19·7	14·67	12·1	13·9	9·60	12·08	6·89	4·1	5·15	8·7
Length: Rifled portion, in ins.	181·9	407·9	352·8	149·8	150·0	129·3	349·6	302·4	201·6	..	..	..	128·5	..	..	85·7	113·6	62·7	44·3	45·9	..
Length: Powder Chamber ,,	45·3			44·7	44·4	44·7	..	..	53·5	..	..	..	31·1	..	..	16·7	19·5	10·7	..	9·73	..
Length: Bore, in calibres	18·9	40	35	18·8	18·8	16·8	..	32·0	26·1	37·0	32·2	36·0	27·2	32·2	37·2	20·8	33·6	21·4	..	17·4	..
Number of Grooves	72	..	..	36	48	36	..	..	56	..	..	..	36	..	..	32	32	24	24	12	..
Depth of Grooves, in inches	0·079	..	..	0·077	0·079	0·077	..	..	0·059	..	..	..	0·059	..	..	0·059	0·049	0·049	..	0·051	..
Twist, in calibres	45	..	..	50	50	50	..	..	25	..	..	..	25	..	..	40	25	40	..	46	..
Weight: Gun, including Breech Gear, tons	35·4	43·4	43·2	21·7	18·7	17·7	25·4	21·7	18·7	14·0	4·4	5·4	4·04	1·25	2·28	1·38	1·15	0·44	0·10	0·23	0·65
Weight: Breech Block, in lbs.	2954	..	..	2050	1973	1973	..	..	..	..	..	..	390·2	..	..	163·1	149·9	86·0	..	55·1	..
Weight: Armour-piercing projectile, in lbs.	725·3	562·2	562·2	412·3	412·3	412·3	474·0	474·0	474·0	309	88	88	112·4	40	40	..	..	..	..	..	15
Weight: Common Shell, in lbs.	725·3	474·0	474·0	357·1	357·1	357·1	474·0	474·0	474·0	309	..	..	112·4	..	..	40·1	39·7	14·9	6·61	8·3	..
Weight of Bursting Charge: Armour-piercing Shell, in lbs.	7·7	..	..	5·3	5·3	5·3	7·05	7·05	6·6	4·4	..	..	1·5	..	..	..	..	..	..	..	..
Weight of Bursting Charge: Common Shell, in lbs.	19·8	25·4	25·4	14·3	14·3	22·0	16·5	16·5	15·4	11·1	..	..	4·3	..	..	2·4	0·9	0·4	..	0·6	..
Weight of Firing Charge: Armour-piercing Shell, in lbs.	202·8	352·7	297·6	105·8	105·8	125·7	89·3	152	152·1	60·2	13·5	18·7	33·1	4·8	..	..	..	..	..	..	2·1
Weight of Firing Charge: Common Shell, in lbs.	202·8	352·7	297·6	105·8	105·8	125·7	..	..	152·1	60·2	..	..	33·1	..	..	8·8	8·8	3·3	0·88	0·9	..
Initial Velocity: Armour-piercing projectile, ft.-sec.	1713	2362	2133	1588	1588	1578	2296	1803	1657	2360	2034	2379	1624	2034	2319	..	..	..	..	..	2020
Initial Velocity: Common shell, ft.-sec.	1713	..	..	1641	1641	1654	..	..	1657	..	..	..	1624	..	..	1545	1526	1545	1545	1053	..
Muzzle Energy: Total, foot-tons	14,750	21,750	17,740	7211	7211	7119	17330	10683	9024	11934	2525	3453	2055	1119	1530	..	..	..	..	..	424
Muzzle Energy: Per in. circ., ft.-tons	391	628·4	512·4	223	223	220	..	401·2	304	..	..	..	111·5	..	..	..	..	..	..	..	..
Perforation at Muzzle, in ins. by Tresidder's formula	20·8	30·6	26·7	15·1	15·1	15·0	29·7	20·7	18·0	26·7	13 4	17·1	11·0	10·8	13 3	..	..	..	..	..	..

A 17-cm. Q.F. is to be introduced for the new battleships.

ITALIAN NAVAL ORDNANCE.

	Armstrong Breech Loading.					Q.F.	Armstrong B.L.	Armstrong Quick Firing.					
Designation by Calibre, in centimètres	43·1† New Pattern.	43·1† Early Pattern. 1882.	34·3	30·5	25·4	20·3	15·2	15·2	15·2	15·2	12·0	12·0	7·6
Calibre, in inches	17	17	13·5	12	10	8	6	6	6	6	4·7	4·7	3·0
Length: Total, in feet	40·75	39	36·09	..	31·8	..	16·9	17·0	20·9	20·9	16·2	13·0	..
Length: Rifled Bore, in inches	346·8	315·7	..	..	..	..	..	..	..	..	189	..	..
Length: Powder Chamber, in inches	84·5	98	..	..	..	..	..	..	..	..		..	..
Length: Bore, in Calibres	27	26	..	40	40	45	32	33·0	40	40	40	35	40
No. of Grooves	82	82	56	..	..	..	..	..	..	..	22	22	..
Twist of Rifling, in Calibres	50	50	..	..	..	..	..	..	..	..	34·4	..	..
Total Weight, in tons	104·3	101·5	67·9	..	30	..	5·4	5·1	5·7	6·5	2·05	1·69	0·6
Firing Charge: Armour-piercing projectile, lbs.	900·0	725	630·5	..	..	..	46	46	46	17·6*	..	..	..
Firing Charge: Common Shell, „	600	480	..	..	..	..	..	.	..	..	..	..	..
Weight: Armour-piercing projectile, „	2000	2000	1250	850	448	..	98	98	100	100	45·0	36·0	12
Weight: Common Shell, „	2000	2000	1250	..	..	..	..	..	..	..	..	36·2	..
Weight: Shrapnel „ „	2017	2017	1250	..	..	..	..	..	..	..	..	29·8	..
Weight: Case Shot „	..	..	..	..	..	..	..	..	..	..	..	..	..
Bursting Charge: Armour-piercing projectile, „	32	32	17·4	..	..	..	2·0	2·0	5·1	4·4	..	1·83	..
Bursting Charge: Common Shell, „	60	60	87·1	..	..	..	..	..	..	..	..	3·02	..
Bursting Charge: Shrapnel „ „	5	5	4·25	..	..	..	..	..	..	..	..	0·35	..
Muzzle Velocity, in ft.-sec	1992	1935	2016	2500	2460	..	1952	1985	2149	2297	2180	..	2625
Muzzle Energy: Total, foot-tons	55,030	51,930	35,230	..	18,798	..	2577	2705	3169	3622	1490	..	573
Muzzle Energy: Per inch circumference, foot-tons	1035	976·3	830·8	..	..	..	..	..	..	..	..	..	..
Perforation at Muzzle, inches of iron by Tresidder's formula	36·7	35·0	33·0	40·5	31·0	.	13·2	13·6	15·4	17·0	12·4	..	10·2

* Ballistite. † There are four types of these bores, viz.—types Lauria, Lepanto, Italia, Valente.

Note.—There is also a 6-inch quick-firing gun, 40 cals. M.V., 2600 f.s.

RUSSIAN NAVAL ORDNANCE.

	Obukhoff Steel Breech Loading Hooped Guns.									Steel B.L. Guns.		
Designation by Calibre, in inches	12	9	*a* 9 M. 67.	*b* 9	8	8	8 M. 67.	6 Long.	6	4·2 9-pdr.	3·43 Long 4-pdr.	3·43 4-pdr.
Calibre in centimètres	30·48	22·86	22·86	22·86	20·32	20·32	20·32	15·24	15·24	10·67	8·70	8·70
Total Length, in feet	35	26·25	15·0	13	23·33	20	14·6	17·5	14	7·0	6·9	5·8
Length of Rifled Portion of Bore, in inches	..	..	124·0	..	..	..	128·0	..	118·7	65·0	62·6	53·0
Length of Powder Chamber, in inches	..	..	28·5	..	..	..	23·0	..	30·5	8·0	10·7	..
Length of Bore in calibres, including Powder Chamber	31·9	35	16·9	..	35	30	18·9	35	24·9	17·4	21·4	..
Number of Grooves, in ins.	..	..	32	32	..	..	30	..	..	16	24	12
Depth of Grooves in ins.	..	..	0·110	0·110	..	..	0·090	..	0·060	0·055	0·050	0·050
Twist of Rifling in cals.	..	..	60	60	..	..	70	..	*24	50	40	41
Total Weight, in tons	55·7	19·44	15·0	12·5	13·64	12·74	9·65	6·26	4·08	0·87	0·45	0·35
Weight of Steel Shell, in lbs.	731	..	249·1	275·6	..	..	172·0	..	90·9	..	..	..
Weight of Chilled Shell, „	..	..	275·6	264·7	..	193·1	169·8	..	119·0	..	..	..
Weight of Common Shell, „	..	268·2	266·8	266·8	192·3	172·4	172·0	73·35	..	24·2	15·2	12·6
Weight of Case Shot, „	..	..	176·4	176·4	..	..	134·5	..	..	22·3	15·2	11·0
Weight of Firing Charge: Steel Shell, „	338	..	64·2	47·0	..	..	31·5	89·38	..	..	..	..
Weight of Firing Charge: Chilled Shell, „	..	..	47·0	47·0	..	72·0	29·3	39·6	37·8	..	..	..
Weight of Firing Charge: Common Shell, „	..	180	42·1	42·1	88·2	72·0	28·4	39·6	..	2·6	3·1	1·3
Muzzle Velocity, in feet	2090	2376	1463	1260	1925	1796	1352	2080	1739	..	1444	..
Muzzle Energy: Total, foot-tons	..	10500	4095	3035	..	4321	2180	2682	1905	..	..	..
Muzzle Energy: Per Inch Circumference, ft.-tons	22·130	371·4	144·7	107·4	..	172·0	86·7					
Perforation at Muzzle, in inches	..	20·2	12·3	10·5	..	13·5	9·5	142·3	101·1	..	..	..
Perforation at Muzzle, by Tresidder's formula	28·3	24·0	..	..	15·7	14·2	..	12·50 ..	10·5 12·2	.. ..	.. ..	.. ..

NEW PATTERN RUSSIAN NAVAL GUNS.

The following guns are in use in the Russian Navy, the ballistics being somewhat as under :—

	12-in.	10-in.	9-in.	8-in.
Length	40 cals.	45 cals.	45 cals	45 cals.
Projectile	720 lbs	488 lbs	403 lb.	188 lbs
Muzzle Velocity	2600f.s	2600f.s	2500f.s	2800f.s
Perf. Wt. Ir. Muzzle	38 ins.	35 ins.	32 ins.	27 ins.
Perf. Wt. Ir. 2000 yds.	30 „	27 „	24 „	20 „

Q.F. GUNS.

	6-in.	4·7-in.	12-pdr.
Length	45 cals.	95 cals	50 cals.
Projectile	89 lbs.	46 lbs.	12 lbs.
Muzzle Velocity	2700 f.s.	2600 f.s.	2700 f.s.
Perf. Wt. Ir. Muzzle	20½ ins.	15½ ins.	10·2 ins.
Perf. Wt. Ir. 2000 yds.	12 „	9 „	4·8 „

* Maximum of increasing twist. *a* New. *b* Converted. There exist also 15 and 10·7-cm. Krupp guns.

SPANISH NAVAL ORDNANCE.

	Hontoria, Pattern 83.								Armstrong, Pattern 83.			Armstrong.			Krupp.							
	Breech Loading.											Muzzle Loading.		Pattrn. 81 B.L.	Breech Loading.		Q.F. guns.					
Designation by Calibre	32-cm.	28-cm.	24-cm.	20-cm.	18-cm	16-cm.	14-cm	12 cm.	12-cm.	8·7-cm.	7·5-cm. long.	22·86-cm	20·3-cm	6-in.	15-cm.	12-cm.	15-cm.	14-cm.	12-cm.	75-mm.	57-mm.	[illegible]
Calibre, in inches	12·60	11·02	9·45	7·87	7·09	6·34	5·51	4·72	4·72	3·4	2·95	9·00	8·00	6·00	5·87	4·72	5·9	5·51	4·72	2·95	2·24	1·85
Length: Total length, in feet	38·7	33·8	29·0	..	21·75	19·3	16·91	14·5	13·75	7·9	7·50	13·0	11·0	14·5	17·13	11·81	19·6	20·7	..	..	..	..
Length: Rifled Portion, in inches	352·4	309·1	..	..	..	170·6	149·1	126·0	135·8	75·0	70·7	104·0	102·0	126·9	..	..	..	..	..	..	..	..
Length: Powder Chamber, in inches	86·8	77·1	..	..	..	49·8	53·9	39·4	19	13	13	..	..	29·7	..	..	..	..	..	..	..	..
Length: Bore, in calibres	50	50	30	..	30	35	35	35	33	27	28·7	14	14·75	26·1	35	30	37	45	45	40	42	40
No. of Grooves	80	70	60	50	45	40	35	30	22	20	18	6	4	28	36	32	..	..	..	..	..	..
Depth of Grooves, in ins.	0·06	0·06	0·05	0·06	0·04	0·04	0·04	0·04	0·03	0·03	0·03	0·18	0·18	..	0·06	0·06	..	..	..	..	..	..
Twist of Rifling, in cals.	From 0 to 30.								40	30	35	45	40	100 to 40	25	25	..	..	..	..	..	..
Total Weight, in tons	47·3	32·5	20·7	11·5	8·71	6·1	4·1	2·6	2·2	0·45	0·35	12·0	9·0	4·0	4·7	2·1	4·39	4·8	2·65	0·9	0·34	0·23
Weight: Armourpiercing projectile, in lbs.	1041	694·3	438·7	253·5	187·4	130·1	86·0	53·1	39·2	..	..	250·0	180·0	78·3	84·9	43·65	100	70	55	14	6	3·3
Weight: Common Shell, in lbs.	879·6	586·4	370·4	213·8	..	112·4	75·0	47·2	36·4	14·1	11·5	250·0	180·0	73·6	65·5	34·61	..	..	..	..	..	..
Weight: Ring Segment, in lbs.	886·3	590·8	370·4	211·6	..	112·4	75·0	47·6	38·6	15·4	11·7	..	..	83·6	..	34·61	..	..	..	..	..	..
Firing Charge: Armour-piercing projectile, in lbs.	485·0	352·7	220·5	112·4	94·8	66·1	44·1	28·7	16·0	..	..	50·0	35·0	34·0	37·48	19·29	..	..	15·4	7·1	1·93	..
Firing Charge: Other projectiles	463·0	319·7	220·5	..	..	61·7	..	28·7	11·9	4·0	4·0	33·0	21·0	24·9	25·4	..	..	..	..	..	..	..
Muzzle Velocity, in feet	2034	2034	2034	2034	2034	2054	2001	1988	2000	1625	1709	1339	1339	1929	2001	1887	2264	2460	2423	2100	1870	2330
Muzzle Energy: Total, in ft.-tons	29850	24030	12580	7271	5374	3806	2386	1511	1087	258	233	3105	2239	2018	2357	1076	3554	2936	2238	428	145	124
Muzzle Energy: Per inch circumference, ft.-tons	754·3	694·0	423·9	294·1	241·4	191·1	137·8	101·9	73·33	..	..	110·0	89·1	1071	127·8	72·6	..	..	..	..	..	..
Perforation at Muzzle, in inches	*32·9	*28·7	*24·6	*20·5	*18·6	*16·6	*13·9	*11·6	*9·3	..	..	10·6	9·6	*11·0	*12·7	*9·7	17·0	16·5	15·5	7·9	5·0	5·7
Metal and Construction	St. Jacket and Hoops.								St.			St. and Wt. I.		St.	St.							

St. stands for Steel; I. for Iron.

* By Krupp's formula.

Note.—The Carlos V. has 11-in. 45 cal. guns. M.V. probably 2500 f.s.

NAVAL ORDNANCE OF SWEDEN AND NORWAY.

Sweden.

	Armstrong.			Bofors.	New Pattern Q.F.		Model 81.		Model 83.		M. 85.	M. 89.
Designation by Calibre, in cms.	25	25	24	21	15 Q.F.	12 Q.F.	27	12	15	8	25	15
Calibre, inches	10	10*	9·45	8·2	5·9	4·7	10·80	4·72	6·00	3·31	10·00	6·0
Total Length, feet	29·5	28·6	27·0	30·7	22·2	17·9	23·10	10·29	13·87	7·37	28·33	16·98
Length: Rifled Portion of Bore, ins.	..	..	..	..	..	..	191·6	91·5	124·1	71·3	2609	155·2
Length: Chamber, ,,	..	..	..	..	..	..	66·2	20·6	31·1	9·7	58·1	35·2
Length: Bore in calibres, ,,	32	35	32·4	43	..	43·3	23·9	24·0	25·7	24·3	32·9	32
Number of Grooves	..	..	..	..	..	..	45	30	28	24	42	28
Twist of Rifling	..	..	..	..	..	..	40	30	30	33	40	30
Total Weight, tons	29·5	28·6	23·5	16·3	5·8	2·7	27·1	1·9	4·2	4·2	29·8	5·2
Weight of Armour-piercing Shell in lbs.	450	450	400	309	100	46	476·2	..	100·0	..	449·7	100
Weight of Common Shell, in lbs.	401	401	..	..	..	..	396·8	48·5	100·0	14·8	401·2	100
Weight of Firing Charge: Armour-piercing Shell, in lbs.	242	smoke-less	182	..	18	9·15	206·4	..	35·3	..	242·5	54·0
Weight of Firing Charge: Common Shell, lbs.	..	..	..	..	..	..	145·5	16·0	35·3	3·3	242·5	..
Muzzle Velocity, feet.	2100	2362	2051	2297	2460	2428	1788	1640	1663	1542	2100	2067
Total foot-tons	13760	17406	11670	11303	4196	1893	10550	..	1918	..	13750	2961
Muzzle Energy: Per inch Circumference.	..	..	..	..	..	..	311·3	..	101·7	..	437·7	157·2
Muzzle Energy: Perforation through Iron by Tresidder's formula	24·5	29·2	22·9	25·7	18·9	14·2	18·9	..	10·5	..	24·5	13·9

Norway.

	Old Pattern Krupp, B.L.				Modern Guns.								
Designation by Calibre, in cms.	26 No. 2.	26 No. 1.	15	12 No. 2.	21	21 Q.F.	21 Q.F.	15	15 Q.F.	12 Q.F.	12 Q.F.	76mm.	7cm.
Calibre, inches	10·24	10·24	5·91	4·72	8·24	8·0	8·24	5·9	..	4·7	4·7	3·0	2·8
Total Length, feet	25·59	18·77	12·63	13·78	24·0	27·9	31·3	19·6	..	..	..	..	..
Length: Rifled Portion of Bore, ins.	218·9	160·4	112·4	128·6	..	..	..	..	..	..	..	..	..
Length: Chamber, ,,	55·4	34·1	22·6	36·8	..	..	..	..	..	..	..	..	..
Length: Bore in calibres, ,,	30	19·0	22·8	35	32	40	43·8	37·1	43·8	45	43·9	40	38
Number of Grooves	60	60	36	32	..	..	..	..	..	..	..	..	..
Twist of Rifling	∝25	45	45	∝25	..	..	..	..	..	..	..	..	..
Total Weight, tons	24·8	21·7	3·9	2·31	13·9	15·5	18·7	5·6	..	3·1	2·65	0·6	0·63
Weight of Armour-piercing Shell in lbs.	606·3	463·0	86·0	57·3	309	210	309	112	..	46	45	12·5	10·3
Weight of Common Shell, in lbs.	606·3	381·4	69·4	57·3	..	..	..	..	..	..	..	..	..
Weight of Firing Charge: Armour-piercing Shell, in lbs.	191·8	99·2	22·0	19·8	115	32	47	58·4	..	6·6	8·4	1·7	1·9
Weight of Firing Charge: Common Shell, lbs.	191·8	81·6	20·9	19·8	..	..	..	..	..	..	..	..	..
Muzzle Velocity, feet.	1722	1575	1624	1804	1903	2242	2300	2070	2502	2361	2570	2200	2379
Total foot-tons	12460	7966	1573	1290	7760	7319	11314	3328	..	1785	2060	419	404
Muzzle Energy: Per inch Circumference.	387·4	247·7	84·7	87·1	..	..	..	..	..	..	..	..	..
Muzzle Energy: Perforation through Iron by Tresidder's formula	20·9	15·9	9·4	10·5	19·2	20·2	25·6	15·6	..	13·6	15·3	8·0	8·4

* Schneider-Canet. There are also 6-prs., with M.V. 2165 f.s. to 2310 f.s., and 3-prs., with M.V. 2428 f.s.

UNITED STATES NAVAL ORDNANCE.

NATURE OF GUN.	Calibre.	Weight.	Total Length.	Total Length of Bore.	Length of Rifling.	Twist of Rifling.	Length of Chamber.	Weight of Service Charge. Brown Powder.	Weight of Service Charge. Smokeless Powder.	Weight of Projectile.	Muzzle Velocity (Service). Brown Powder.	Muzzle Energy. Brown Powder.	Perforation of Wrought Iron at Muzzle.†
	inch.	tons.	feet.	inch.	inch.		inch.	lbs.	lbs.	lbs.	ft.-seconds.	ft.-tons.	inch.
3-in. (14 pr.)	3	0·87	12·5	149·7	125·5	..	21·3	..	5	14	3000	874	13·5
4-in. Q.-F., Mark I.	4	1·5	13·7	157·3	130·3	zero to 1 in 25	24·7	12 to 14	..	33	2000	915	9·8
4-in. Q.-F. Gun	4	1·5	13·7	157·5	128·1	..	25·4	..	..	33	2000*	..	9·8
4-in. Q.-F., Mark VII., of 50 Cals.	4	2·56	17·0	200·0	168·4	..	31.6	..	15	32	2900	1,999	16·9
5-in. Q.-F., Mark I.	5	2·8	13·5	150·3	120·8	1 in 180 to 1 in 30	27·1	26 to 29	..	60	2000	1,660	11·8
5-in. Q.-F. Gun	5	3·1	17·4	191·5	164·4	zero to 1 in 25	32·0	28 to 30	..	50	2300	1,834	13·2
5-in. Q.-F., Mark V.	5	4·46	21·3	250	212·9	..	37·2	..	27	60	2900	3,503	20·5
6-in. B.L.R., Mark I.	6	4·8	15·8	176·0	136·7	1 in 180 to 1 in 30	36·9	50	..	100	2000	2,773	..
6-in. B.L.R., Mark II.	6	4·9	16·1	180·1	144·9	..	32·7	45 to 48	..	100	2000	..	13·8
6-in. B.L.R., Mark III., of 30 Cals.	6	4·8	16·3	183·8	147·3	zero to 1 in 25	34·0	44 to 47	..	100	2000	..	..
6-in. B.L.R., Mark III., of 35 Cals.	6	5·2	18·8	213·8	177·3	..	34·0	..	..	100	2080	2,990	14·7
6-in. B.L.R., Mark III., of 40 Cals.	6	6·0	21·3	243·8	207·3	..	34·0	..	..	100	2150	3,204	15·4
6-in. Q.-F. Gun	6	6·0	21·3	243·8	204·3	..	37·0	44 to 47	..	100	2150	3,200	15·4
6-in. Q.-F., Mark VI.	6	8·17	25·0	293·7	215·3	..	48·4	..	46	100	2900	5,838	24·2
7-in. Q.-F.	7	..	..	..	..	..	..	..	74	165	2900	9,646	28·7
8-in. B.L.R., Mark I.	8	12·3 / 12·9	21·5	239·9	195·2	1 in 180 to 1 in 30	42·1	105 to 115	..	250 / 250	2000 / 2000	6,932	19·0
8-in. B.L.R., Mark II.	8	13·0	21·5	239·9	195·2	..	42·1	..	..	..	..	..	19·0
8-in. B.L.R., Mark III., of 35 Cals.	8	13·1	25·4	290·5	242·8	zero to 1 in 25	45·1	..	..	250	2080	7,498	20·1
8-in. B.L.R., Mark III., of 40 Cals.	8	15·2	28·7	330·5	282·8	..	45·1	..	..	250	2150	8,011	21·1
8-in. B.L.R., Mark V., of 45 Cals.	8	18·0	28·6	335·0	271·0	..	64·0	..	115	250	2800	13,602	31·1
10-in. B.L.R., Mark I., of 30 Cals.	10	25·7	27·4	306·3	247·3	1 in 180 to 1 in 35	57·2	225 to 240	..	500	2000	13,864	24·0
10-in. B.L.R., Mark I., of 35 Cals.	10	27·1 / 28·2	30·5	343·8	283·7	zero to 1 in 25	57·2	..	..	500	2060	14,709	25·0
10-in. B.L.R., Mark II., of 30 Cals.	10	25·1	27·4	307·3	247·3	zero to 1 in 26·8	57·2	..	..	500	2000	13,864	24·0
10-in. B.L.R., Mark II., of 35 Cals.	10	27·6	31·2	354·9	294·9	zero to 1 in 25	57·2	..	..	500	2100	15,285	25·8
10-in. B.L.R., Mark III., of 40 Cals.	10	33·4	33·3	389·0	313·4	..	75·6	..	240	500	2800	27,201	42·0
12-in. B.L.R., Mark I.	12	45·2	36·8	419·2	343·1	..	74·1	425	..	850	2100	25,985	30·8
12-in. B.L.R. Mark III., of 40 Cals.	12	52	41·8	480·1	388·1	..	91·9	..	350	850	2800	46,246	47·2
13-in. B.L.R., Mark I.	13	60·5	40·0	454·5	370·5	..	80·9	550	..	1100	2100	33,627	33·5
13-in. B.L.R., Mark II.	13	60·5	40·0	454·5	370·5	..	..		280	1100	2300	40,350	38·5

NOTE.—The weight of fixed ammunition for Q.-F. 4-in. and 5-in. guns is 58 and 95 lbs. respectively. 10″ = 2200, 12″ = 2300, 13″ = 2300. The charges are kept down to suit the sight bars.

* With smokeless powder 4″ = 2200, 5″ = 2650, 6″ = 2550, 8″ = 2300,

† By Tresidder's formula.

ELSWICK GUNS.

This Table is supplied by the Manufacturers.

Diameter of Bore, ins. ...	1·46			1.85			2.244			3·0		
do. do. m.m. ...	37			47			57			76·2		
Length of Bore, cals. ...	10	45	50	40	45	50	40	45	50	40	45	50
do. Gun, cals. ...	42·8	47·8	52·8	43·6	48·6	53·6	43·6	48·6	53·6	41·2	46·2	51·2
Weight of Gun, tons ...	·103	·117	·13	·212	·238	·264	·366	·412	·46	·78	·88	·98
do. Projectile, lbs.	1·5	1·5	1·5	3·3	3·3	3·3	6	6	6	11	11	14
do. Battering Charge	ozs. 5·7	ozs. 6·4	ozs. 7·1	ozs. 11·6	ozs. 13·1	ozs. 14·5	lbs. 1·26	lbs. 1.42	lbs. 1.58	lbs. 3·09	lbs. 3·48	lbs. 3·88
Muzzle Velocity, f.-s. ...	2540	2700	2850	2450	2600	2740	2390	2540	2680	2460	2610	2750
Velocity at 2500 yards, f.-s.	811	831	850	957	988	1017	1058	1111	1173	1192	1260	1332
Muzzle Energy, f.-t. ...	67·2	76	81·5	137	155	172	238	268	299	587	661	731
Penetration at Muzzle, wrought iron, ins. ...	5·0	5·5	6·0	6·4	7·0	7·55	7·6	8·3	9·0	10·4	11·35	12·3
Rounds per Minute Guns should be capable of ...	30			30			25			20		

Diameter of Bore, ins. ...	4			4·7			6			7·5		
do. do. m.m. ...	101·6			120			152			190·5		
Length of Bore, cals. ...	40	45	50	40	45	50	40	45	50	40	45	50
do. Gun, cals. ...	41·3	46·3	51·3	41·1	46·1	51·1	41·55	46·55	51·55	41·75	46·75	51·75
Weight of Gun, tons ...	1·83	2·03	2·32	3·01	3·38	3·77	6·52	7·3	8·1	12·7	14·3	15·9
do. Projectile, lbs.	31	31	31	45	45	45	100	100	100	200	200	200
do. Battering Charge	lbs. 7·3	lbs. 8·25	lbs. 9·17	lbs. 11·9	lbs. 13·4	lbs. 14·91	lbs. 21·7	lbs. 27·9	lbs. 31	lbs. 48·4	lbs. 54·5	lbs. 60·6
Muzzle Velocity, f.-s. ...	2530	2690	2840	2690	2850	3010	2650	2810	2960	2620	2780	2930
Velocity at 2500 yards, f.-s.	1500	1601	1677	1633	1711	1754	1844	1950	1998	1969	2088	2147
Muzzle Energy, f.-t. ...	1376	1555	1735	2260	2535	2930	4890	5475	6075	9520	10720	11906
Penetration at Muzzle, wrought iron, ins. ...	13·73	15·05	16·30	16·4	17·9	19·55	21·3	23·2	25·15	26·75	29·10	31·65
Rounds per Minute Guns should be capable of ...	15			10			8			5		

Diameter of Bore, ins. ...	8·0			9·2			10			12		
do. do. m.m. ...	203			233·7			254			305		
Length of Bore, cals. ...	40	45	50	40	45	50	40	45	50	40	45	50
do. Gun, cals. ...	41·75	46·75	51·75	41·85	46·85	51·85	41·65	46·65	51·65	41·7	46·7	51·7
Weight of Gun, tons ...	15·35	17·3	19·3	23·4	26·4	28·4	30·0	32·6	37·5	52·0	58·5	65·2
do. Projectile, lbs.	250	250	250	380	380	380	500	500	500	850	850	850
do. Battering Charge	lbs. 58·6	lbs. 66	lbs. 73·6	lbs. 89·1	lbs. 100·5	lbs. 111·7	lbs. 114·5	lbs. 129	lbs. 143·5	lbs. 198	lbs. 223	lbs. 248
Muzzle Velocity, f.-s. ...	2580	2740	2890	2580	2740	2890	2550	2710	2850	2570	2730	2880
Velocity at 2500 yards, f.-s.	1990	2116	2190	2055	2186	2267	2076	2213	2308	2161	2306	2405
Muzzle Energy, f.-t. ...	11520	13000	14480	17510	19800	22000	22545	25462	28161	39000	43900	48800
Penetration at Muzzle, wrought iron, ins. ...	28·3	31·15	33·7	32·65	35·7	38·6	35·5	39·0	41·9	42·6	46·7	50·9
Rounds per Minute Guns should be capable of ...	4			2			2			2		

Guns from 3 to 6 inches can be fitted with either a metallic cartridge case or modified de Bange pad. The high velocities, however, are not desirable, except on rare occasions. They are, however, obtained with pressures under 17 tons.

RAPIDITY.—SOME RESULTS ACTUALLY OBTAINED.

8-in. 15·5-ton gun, single motion mechanism, 3 rounds in 28 seconds at drill; 4 rounds in 62 seconds on board cruiser "Blanco Encalada" (ammunition brought from magazine).
12-in. 46-ton B.L. gun, H.M.S. Majestic, interval between 2 rounds, 1 minute 19 seconds; H.M.S. Cæsar, 1 minute 4 seconds.
12-in. B.L. gun, H.M.S. Illustrious, 6 rounds fired from one turret in 1 minute 47 seconds.
A pair of 12-in. guns, 8 rounds in 2 minutes 10 seconds.
A pair of 12-in. 51-ton guns, 5 rounds per gun fired alternately, guns started empty, 5 minutes 6 seconds.
12-in. B.L. gun, Japanese battleship Mikasa, interval between 2 rounds of same gun, 30 seconds.
Ocean (China), prize firing, 1901. 12-in. B.L., 0·58 hits per gun per minute.
Terrible ,, ,, ,, 6-in. Q.F., 4·25 ,, ,,
Barfleur ,, ,, 4·7-in. Q.F., 5·7 ,, ,,

VICKERS, SONS AND MAXIM'S GUNS AND MOUNTINGS.

This Table is supplied by the Manufacturers.

								Field.		Naval.			
		37 mm. 30 cal.	37 mm. 42·5 cal.	3-pdr. 50 cal.	6-pdr. 42·3 cal.	6-pdr. 50 cal.	Mountain. 75 mm. 10·7 cal.	Light. 3-inch. 23·7 cal.	Heavy. 3-inch. 29 cal.	3-in. 45 cal.	3-in. 50 cal.	4-inch. 45 cal.	4-inch. 50 cal.
Gun.	Diameter of Bore (in ins.)	1·157	1·457	1·85	2·244	2·244	2·953	3	3	3	3	4	4
	Length of Bore (in ins.)	43·5	62	92·5	95	112·2	31·6	71·05	87·2	136·6	150	180	200
	Total length of Gun (in ins.)	73·75	91	101·25	104·4	116·4	35·85	71·3	90·63	140·1	154	184·65	206·35
	Maximum pressure in Chamber, tons per sq. in.	13	14	16	15	15	8	15	15	17	17	17	17
	Weight of Charge	oz. grs. 1 110	oz. 3	oz. 13	oz. 15	lb. oz. 1 4	lb. 6·25	lb. oz. 1 1	lb. oz. 1 14	lb. oz. 4 2	lb. oz. 5 3	lb. oz. 8 2	lb. oz. 8 2
	Weight of Projectile (lbs.)	1	1·25	3·3	6	6	12·5	12·5	17·63	12·5	12·5	31	31
	Total weight of Gun, including Breech Mechanism	c. q. l. 3 2 24	c. q. l. 5 1 26	c. q. 5 2	c. q. 6 2	c. q. l. 8 0 0	c. q. l. 2 0 13	c. q. l. 4 0 0	c. q. l. 7 1 25	c. q. l. 14 3 0	c. q. l. 16 1 16	t. c. q. 1 14 1	t. c. q. 1 16 1
	Muzzle Velocity in feet per second	1800	2350	2800	2300	2500	918	1700	1700	2800	3020	2945	3020
	Muzzle Energy in foot tons	22·5	48	179·4	220	260	73	250·5	353·4	679·5	790	1865	1960
	Penetration of Wrought Iron Plate at Muzzle by Gavre's formula (ins.)	1·9	3·3	6·7	6·2	7	..	..	..	10·2	11·35	15·4	16
	Penetration of Steel Plate at Muzzle by Gavre's formula (ins.)	1·5	2·6	5·1	4·8	5·4	..	..	..	7·9	8·8	11·9	12·4
	Rounds per minute	300	300	30	23	28	14	20	20	20	20	15	15
Mounting.	Weight of Mounting complete with Shield	c. q. l. 4 1 10	c. q. l. 3 2 5	c. q. l. 9 0 4	c. q. 12 2	c. q. l. 12 0 0	c. q. l. 5 3 5	No Shield. Weight of equipment with 40 rds.	36 rds.	t. c. 1 6	t. c. q. 1 10 0	t. c. q. 4 4 3	t. c. q. 4 10 0
	Thickness of Shield (in ins.)	¼	no shield	¼	[illegible]	¼	no shield			2	2	4	4
	Weight of Shield	q. l. 3 11	,,	c. q. l. 1 0 8	c. q. 1 0	c. q. l. 1 3 9	,,	t. c. q. l. 1 8 2 5	t. c. q. 1 16 0	c. q. 9 2	c. q. l. 9 0 0	t. c. q. 2 6 0	t. c. q. 2 6 0
	Angle of Elevation	16°	13°	20°	20°	20°	26°	16°	16°	20°	20°		20°
	Angle of Depression	25°	25°	20°	20°	15°	10°	8°	8°	10°	10°	7°	7°

		4·7-in. 45 cal.	4·7-in. 50 cal.	14 cm. 45 cal.	6-in. 40 cal.	6-in. 45 cal.	6-in. 50 cal.	7·5-in. 45 cal.	7·5-in. 50 cal.	8-inch. 45 cal.	9·2-in. 47 cal.	10-in. 45 cal.	12-in. 40 cal.
Gun.	Diameter of Bore (in ins.)	4·724	4·724	5·512	6	6	6	7·5	7·5	8	9·2	10	12
	Length of Bore (in ins.)	212·6	236·2	218	240	269·5	300	337·5	375	360	429·3	450	480
	Total length of Gun (in ins.)	220	213·6	257·7	249·7	279·2	309·73	349·2	386·7	372·1	442·35	462·75	496·5
	Maximum pressure in Chamber, tons per sq. in.	17	17	16·5	17	17	16	16·5	16·5	17 0	16·5	17	17
	Weight of Charge	lb. oz. 12 14	lb. oz. 12 14	lb. oz. 21 14	lb. oz. 35 5	lb. oz. 35 5	lb. 40	lb. oz. 86 8	lb. oz. 86 8	lb. 91	lb. oz. 162 1	lb. 208	lb. 309
	Weight of Projectile (lbs.)	45	45	88·19	100	100	100	200	200	250	380	500	850
	Total weight of Gun, including Breech Mechanism	t. c. q. 3 3 3	t. c. 3 6	t. c. 5 18	t. c. 6 15	t. c. q. 7 8 2	t. c. q. 7 18 3	t. c. q. 14 3 3	t. c. 16 0	t. c. q. 18 16 2	t. c. 28 1	t. c. 31 0	t. c. 50 7
	Muzzle Velocity in feet per second	2925	3000	2860	2780	2860	3000	2920	3018	2850	2900	2850	2666
	Muzzle Energy in foot tons	2670	2810	4990	5360	5670	6240	11825	12630	14080	22160	28160	41890
	Penetration of Wrought Iron Plate at Muzzle by Gavre's formula (ins.)	16·65	17·25	22·1	21·2	22·1	23·6	23·9	30·8	31·1	37	40·0	43·8
	Penetration of Steel Plate at Muzzle by Gavre's formula (ins.)	12·9	13·4	17·1	16·4	17·1	18·3	22·8	29·4	24·1	28·7	31·1	31
	Rounds per minute	12	12	10	10	10	10	8	8	6	4	3	2
Mounting.	Weight of Mounting complete with Shield	t. c. q. 6 5 0	t. c. q. 6 12 0	Depending on type of Mounting used.									
	Thickness of Shield (in ins.)	4	4										
	Weight of Shield	t. c. q. 3 18 0	t. c. q. 3 18 0										
	Angle of Elevation	20°	20°										
	Angle of Depression	7°	7°										

SCHNEIDER-CANET QUICK-FIRE GUNS.

These Tables are supplied by the Manufacturers.

LIGHT GUNS.

Calibre, in centimètres	24		20		15			12			10			75			65			57		47	37
Calibre, in inches	9·45		7·87		5·91			4·72			3·94			2·95			2·57			2·24		1·85	1·46
Length, in calibres	40	45	40	45	40	45	50	40	45	50	45	50	60	45	50	60	45	50	60	50	60	60	60
Length, in feet	31·5	35·4	26·2	29·5	19·6	22·2	24·6	15·7	17·7	19·7	14·8	16·4	19·7	11·04	12·3	14·8	9·59	10·65	12·8	9·43	11·2	9·24	7·27
Weight of Gun, in tons	21·45	22·73	11·61	13·18	4·7	5·6	6·2	2·4	2·75	3	1·7	1·8	2·2	0·8	0·9	1·1	0·5	0·54	0·68	0·45	0·59	0·26	0·14
Weight of Projectile, in lbs.	331	331	198	198	88·2	88·2	88·2	46·3	46·3	46·3	28·6	28·6	28·6	13·2	13·2	13·2	8·83	8·83	8·83	5·96	5·96	3·3	1·76
Muzzle Velocity, in ft.-secs.	2787	2868	2787	2868	2622	2721	2819	2573	2670	2754	2573	2688	2885	2452	2590	2819	2452	2590	2819	2590	2787	2787	2787
Muzzle Energy, in ft.-tons	17748	18781	10619	10694	4195	4517	4839	2123	2291	2430	1316	1436	1646	555	613	726	367	409	487	278	319	177	95
Perforation at muzzle, Gavre formula, in ins. (forged steel)	27·4	28·6	22·8	23·8	15·5	16·4	17·3	11·9	12·6	13·2	10·2	10·9	12·1	7·25	7·9	9	6·3	6·8	7·8	5·8	6·55	5·1	4·2
Perforation at muzzle, Tresidder formula, in ins.	32·8	34·2	28·0	29·4	19·7	20·8	22·0	15 7	16·4	17·1	13·5	14·3	15·9	9·7	10·5	11·8	8·4	9·0	10 3	8·1	9·1	7·4	5·8

POWERFUL GUNS.

Calibre, in centimètres	30·5	25·4	24	20·32	20	15	10	6·5	4·7
Calibre, in inches	12	10	9·45	8	7·87	5·91	3·94	2·57	1·85
Length, in calibres	45	45	45	45	45	50	50	50	60
Length, in feet	45	37·5	35·4	30	29·5	24·6	16·4	10·65	9·21
Weight of Guns, in tons	62·9	37·9	30·7	19·48	18·3	8·12	2·1	0·7	0·58
Weight of Projectile, in lbs.	706·4 883	408 518	331 430	219 251·6	198 251·6	88·2 111	28·6	8·83	3·3
Muzzle Velocity, in ft.-secs.	3246 2950	3246 2950	3246 2950	3213 2935	3213 2918	3181 2852	3050	2950	3607
Muzzle Energy, in ft.-tons	51630 53500	29850 31100	24203 26000	15021 15021	14199 14900	6196 6196	1839	536	300
Perforation at muzzle, Gavre, in ins. (forged steel)	47·3 48·5	38·2 39·4	34 8 36·7	29·2	28·4 29·4	20·8 21·0	13·2	8·3	7·6
Perforation at muzzle, Tressider, in ins.	53·5 52·0	44·5 44·0	41·4 41·0	36·0 33·5	34·7 33·5	26·5 24·0	17·4	10·7	10·7

KRUPP QUICK-FIRING GUNS, Mark 1900.

Tables supplied by Manufacturers.

LIGHT GUNS.

Calibre, in centimètres		7·5			10·5			12			15	
Calibre, in inches		2·95			4·13			4·72			5·91	
Total Length of Gun, in cals.	40	45	50	40	45	50	40	45	50	40	45	50
Total Length, in feet	9·84	11·07	12·30	13·78	15·5	17·22	15·75	17·7	19·69	19·55	22·0	24·46
Length of Bore, in inches	108·66	123·43	138·19	153·55	174·21	194·89	175·20	199·25	222·45	218·12	247·49	276·78
Weight of Gun, in lbs.	1185·9	1700·9	1935·7	3748	4189	4740	5512	6283	7055	10582	12015	13558
Weight of Gun, in tons	0·69	0·79	0·89	1·73	1·93	2·18	2·51	2·90	3·25	4·88	5·54	6·25
Weight of Steel Projectile, in lbs.	11·5	11·5	11·5	30·86	30·86	30·86	46·30	46·30	46·30	90·39	90·39	90·39
	14·6	14·6	14·6	39·68	39·68	39·68	59·52	59·52	59·52	112·4	112·4	112·4
Weight of Charge, in lbs.	2·21	2·62	3·07	8·21	9·53	10·87	12·23	14·23	16·25	23·51	27·34	31·19
Muzzle Velocity, in ft.-secs.	2385	2572	2726	2638	2815	2992	2674	2867	3048	2651	2841	3018
	2116	2283	2418	2326	2481	2638	2359	2526	2687	2379	2546	2707
Muzzle Energy, total ft.-tons	452·7	526·0	591	1491	1697	1917	2298	2636	2982	4408	5060	5721
Perforation through Steel, in ins.	5·97	6·69	7·21	9·8	10·75	11·73	11·58	12·8	13·94	14·65	16·14	17·60
Perforation through Iron, Tresidder's formula	8·2	9·2	10·1	13·3	14·5	16·0	15·5	17·2	18·8	19·3	21·2	23·2

Calibre, in centimètres		21			24			28			30·5	
Calibre, in inches		8·27			9·15			11·02			12·01	
Total Length of Gun, in cals.	40	45	50	40	45	50	40	45	50	40	45	50
Total Length, in feet	27·56	30·9	34·45	31·50	35·4	39·37	36·75	41·3	45·93	40·03	45·0	50·03
Length of Bore, in inches	305·91	347·29	388·59	350·80	398·28	445·28	409·46	464·62	519·70	445·67	505·95	565·76
Weight of Gun, in lbs.	29320	33290	37254	44090	50264	56143	70104	79811	89503	90610	10317	115742
Weight of Gun, in tons	13·51	15·34	17·17	20·32	23·16	26·01	32·31	36·78	41·25	41·76	47·55	53·34
Weight of Steel Projectile, in lbs.	249·1	249·1	249·1	374·8	374·8	374·8	595·2	595·2	595·2	771·6	771·6	771·6
	308·6	308·6	308·6	474·0	474·0	471·0	760·6	760·6	760·6	981·0	981·0	981·0
Weight of Charge, in lbs.	64·9	75·62	86·42	97·68	113·98	130·07	155·10	181·00	206·57	200·86	233·91	266·93
Muzzle Velocity, in ft.-secs.	2657	2848	3028	2657	2854	3031	2661	2851	3031	2654	2848	3028
	2385	2559	2720	2365	2533	2697	2352	2523	2680	2356	2526	2684
Muzzle Energy, total ft.-tons	12198	14005	15845	18362	21105	23880	29261	33561	37917	37756	43403	49050
Perforation through Steel, in ins.	21·06	23·23	25·39	24·33	26·89	29·37	28·74	31·73	31·65	30·6	34·76	37·99
Perforation through Iron, Tresidder's formula	27·1	30·1	32·9	31·2	24·7	37·8	36·0	40·0	43·8	39·1	43·5	46·4

HEAVY GUNS.

Calibre, in centimètres		7·5			10·5			12			15	
Calibre, in inches		2·95			4·13			4·72			5·91	
Total Length of Gun, in cals.	40	45	50	40	45	50	40	45	50	40	45	50
Total Length, in feet	9·84	11·07	12·30	13·78	15·5	17·22	15·75	17·7	19·69	19·55	22·0	24·46
Length of Bore, in inches	108·66	123·43	138·19	153·55	174·21	194·89	175·20	199·25	222·45	218·12	247·49	276·78
Weight of Gun, in lbs.	1860·7	2091·4	2325·8	4519·2	5115·1	5688	6721·2	7606·2	8488	12897	14661	16314
Weight of Gun, in tons	0·85	0·96	1·07	2·08	2·35	2·62	3·10	3·51	3·91	5·94	6·76	7·52
Weight of Steel Projectile, in lbs.	11·5	11·5	11·5	30·86	30·86	30·86	46·30	46·30	46·30	90·39	90·39	90·39
	14·6	14·6	14·6	39·68	39·68	39·68	59·52	59·52	59·52	112·4	112·4	112·4
Weight of Charge, in lbs.	2·43	2·78	3·15	8·71	10·12	11·53	13·01	15·10	17·22	24·91	28·88	33·04
Muzzle Velocity, in ft.-secs.	2481	2661	2822	2723	2910	3091	2763	2976	3159	2743	2949	3133
	2205	2362	2507	2402	2566	2730	2438	2625	2785	2457	2644	2808
Muzzle Energy, total ft.-tons	490·5	562·8	633·8	1588	1814	2049	2152	2810	3204	4711	5450	6151
Perforation through Steel, in ins.	6·39	7·01	7·64	10·28	11·26	12·32	12·13	13·50	14·69	15·36	17·01	18·54
Perforation through Iron, Tresidder's formula	8·7	9·7	10·6	13·9	15·4	16·8	16·3	18·1	19·8	20·1	22·3	24·5

Calibre, in centimètres		21			24			28			30·5	
Calibre, in inches		8·27			9·45			11·02			12·01	
Total Length of Gun, in cals.	40	45	50	40	45	50	40	45	50	40	45	50
Total Length, in feet	27·56	30·9	34·45	31·50	35·4	39·37	36·75	41·3	45·93	40·03	45·0	50·03
Length of Bore, in inches	305·91	347·29	388·59	350·80	398·28	445·28	409·46	464·62	519·70	445·67	505·95	565·76
Weight of Gun, in lbs.	35711	40341	44972	53792	60843	67904	85544	96784	108030	110671	125003	139772
Weight of Gun, in tons	16·46	18·59	20·73	24·79	28·04	31·29	39·42	44·60	49·79	51·00	57·61	64·42
Weight of Steel Projectile, in lbs.	249·1	249·1	249·1	374·8	374·8	374·8	595·2	595·2	595·2	771·6	771·6	771·6
	308·6	308·6	308·6	474·0	474·0	474·0	760·6	760·6	760·6	981·0	981·0	981·0
Weight of Charge, in lbs.	68·78	80·03	91·49	103·84	120·59	137·79	165·12	191·80	218·70	213·40	247·58	282·85
Muzzle Velocity, in ft.-secs.	2749	2953	3140	2746	2956	3143	2749	2959	3140	2746	2953	3140
	2467	2654	2822	2441	2628	2795	2431	2618	2776	2434	2618	2785
Muzzle Energy, total ft.-tons	13037	15070	17039	19588	22702	25655	31205	36142	40725	40338	46695	52729
Perforation through Steel, in ins.	22·13	24·49	26·73	25·47	28·31	30·87	30·12	33·47	36·42	32·4	36·65	40·08
Perforation through Iron, Tresidder's formula	28·5	31·8	34·6	32·7	36·3	39·8	37·6	42·2	46·5	41·0	45·8	50·1

NOTE.—Every one of the Guns included in the Tables has been actually constructed and can be supplied on order. Fresh orders are all executed according to Model 1899.

KRUPP QUICK-FIRING GUNS, Mark 1901.

Tables supplied by Manufacturers.

LIGHT GUNS.

Calibre, in centimètres		7·5			10·5			12			15			21			24			28			30·5	
Calibre, in inches		2·95			4·13			4·72			5·91			8·27			9·45			11·02			12·01	
Total Length of Gun, in cals.	40	45	50	40	45	50	40	45	50	10	45	50	40	45	50	40	45	50	40	45	50	40	45	50
Total Length, in feet	9·84	11·07	12·30	13·78	15·5	17·22	15·75	17·7	19·69	19·55	22·00	24·41	27·56	30·9	34·45	31·50	35·4	39·37	36·75	41·3	45·93	40·03	45·0	50·03
Length of Bore, in inches	108·66	123·43	138·19	153·55	174·21	194·89	175·20	199·25	222·45	218·12	247·49	276·78	305·91	347·29	388·59	350·80	398·28	445·28	409·46	464·62	519·70	445·67	505·95	565·76
Weight of Gun, in lbs.	1488	1711	1936	3748	4189	4740	5512	6283	7055	10582	12015	13558	29321	33290	37254	44090	50264	56443	70104	79811	89503	90610	103174	115742
Weight of Gun, in tons	0·68	0·79	0·89	1·73	1·93	2·18	2·54	2·90	3·25	4·88	5·54	6·25	13·51	15·34	17·17	20·32	23·16	26·01	32·31	36·78	41·25	41·76	47·55	53·34
Weight of Steel Projectile,	11·5	11·5	11·5	30·86	30·86	30·86	46·30	46·30	46·30	90·39	90·39	90·39	249·1	249·1	249·1	374·8	374·8	374·8	595·2	595·2	595·2	771·6	771·6	771·6
in lbs.	14·6	14·6	14·6	39·68	39·68	39·68	59·52	59·52	59·52	112·4	112·4	112·4	308·6	308·6	308·6	474·0	474·0	474·0	760·6	760·6	760·6	981·0	981·0	981·0
Weight of Charge, in lbs.	2·77	3·12	3·51	9·30	10·83	12·34	13·93	16·11	18·43	26·67	30·95	35·40	74·07	85·74	97·97	111·23	128·97	147·27	176 59	205·25	234·57	228·61	264·99	303·13
Muzzle Velocity, in ft.-secs.	2690	2890	3068	2835	3035	3232	2900	3097	3291	2877	3068	3264	2884	3081	3271	2884	3081	3268	2887	3081	3271	2881	3074	3268
	2388	2566	2723	2500	2674	2851	2559	2730	2904	2579	2753	2927	2592	2766	2910	2562	2736	2907	2552	2723	2894	2552	2726	2897
Muzzle Energy, total ft.-tons	576	665	749	1720	1968	2236	2701	3079	3475	5183	5905	6680	14360	16361	18491	21589	24622	27817	34367	39143	44242	44371	70349	57182
Perforation through Steel, in ins.	7·13	7·91	8·58	10·87	11·97	13·15	12·99	14·25	15·59	16·46	18·03	19·69	23·66	26·02	28·35	27·32	30·0	32·68	32 28	35·43	38·62	35·36	38·82	42·36
Perforation through Iron, Tresidder's formula	9 9	11·0	11·7	14·7	16·3	18·0	17·6	19·4	21·0	21·8	23·9	26·2	30·7	33·5	37·0	35·0	38·6	42·1	40·7	35·5	48·9	44·2	48·6	53·3

HEAVY GUNS.

Calibre, in centimètres		7·5			10·5			12			15			21			24			28			30·5	
Calibre, in inches		2·95			4·13			4·72			5·91			8·27			9·45			11·02			12·01	
Total Length of Gun, in cals.	10	45	50	40	45	50	40	45	50	40	15	50	40	45	50	40	45	50	40	45	50	40	45	50
Total Length, in feet	9·81	11·07	12·30	13·78	15·5	17·22	15·75	17·7	19·65	19·55	22·00	24·44	27·56	30·9	34·45	31·50	35·4	39·37	36·75	41·3	45·93	40·03	45·0	50·03
Length of Bore, in inches	108·66	123·43	138·19	153·55	174·21	194·89	175·26	199·25	222·45	218·12	247·19	276·78	305·91	347·29	388·59	350·80	398·28	445·28	409·46	464·62	519·70	445·67	505·95	565·76
Weight of Gun, in lbs.	1861	2091	2326	4519	5115	5688	5842	6724	7606	11241	12897	14661	31080	35711	40341	46741	53792	60843	74514	85544	96784	96343	110671	125003
Weight of Gun, in tons	0·85	0·96	1·07	2·08	2·35	2·62	2·70	3·10	3·51	5·18	5·94	6·76	14·32	16·46	18·59	21·54	24·79	28·04	31·34	39·42	44·60	44·40	51·00	57·61
Weight of Steel Projectile,	11·5	11·5	11.5	30·86	30·86	30·86	46·30	46·30	46·30	90·39	90·39	90·39	249·1	249·1	249·1	374·8	374·8	374·8	595·2	595·2	595·2	771·6	771·6	771·6
in lbs.	14·6	14·6	14·6	39·68	39·68	39·68	59·52	59·52	59·52	112·4	112.4	112·4	308·6	308·6	308·6	474·0	474·0	474·0	760·6	760·6	760·6	981·0	981·0	981·0
Weight of Charge, in lbs.	2·99	3·35	3·76	10·16	11·63	13·18	15·10	17·80	20·30	28·88	34·17	39·02	80·03	94·71	108·10	120·60	142·41	162·48	191·80	226·41	258·60	218·02	292·77	334·0
Muzzle Velocity, in ft.-secs.	2876	2999	3123	2949	3150	3337	2933	3146	3353	2910	3120	3320	2917	3130	3330	2917	3130	3330	2920	3133	3330	2917	3127	3330
	2664	2775	2885	2602	2779	2946	2588	2776	2959	2608	2799	2979	2621	2812	2992	2595	2782	2963	2582	2769	2949	2585	2772	2953
Muzzle Energy, total ft.-tons	620	703	795	1862	2123	2391	2762	3182	3611	5308	6109	6922	14683	16926	19168	22121	25461	28849	35174	40499	45888	45501	52277	59280
Perforation through Steel, in ins.	7·52	8·23	8·98	11·50	12·68	13·74	13·23	14·61	16·02	16·73	18·47	20·16	24·06	26·61	29·06	27·80	30·71	33·58	32·84	36·34	39·65	35·98	39·76	43·51
Perforation through Iron, Tresidder's formula	10·5	11·3	12·0	15·6	17·4	19·0	17.8	19·8	21·6	22·0	23·8	26·8	31·3	34·4	38·0	34·8	38·8	43·4	41·6	45·1	50·2	45·2	48·8	54·2

NOTE.—Every one of the guns included in the Tables has been actually constructed and can be supplied on order.

BETHLEHEM STEEL CO.

ORDNANCE.

This Table is supplied by the Manufacturers.

NATURE OF GUN.	Calibre in inches.	Calibre in cms.	Length of bore.	Length of gun.	Weight of gun.	Charge of smokeless powder.	Weight of projectile.	Muzzle velocity.	Muzzle energy.	Perforation at muzzle of U.S. standard face-hardened armour by capped A.P. projectiles.
			cals.	cals.	lbs.	oz.	lbs.	foot-seconds.	foot-tons.	
1-pr.	1·457	3·7	46·4	50	120	3	1	2300	37	
3-pr.	1·851	4·7	46	50	550	19·5	3.3	2300	121	2
6-pr.	2·244	5·8	50	54	960	21	6	2400	240	2·5
						lbs.				
3-in. Q.F.	3	7·62	50	51·4	1900	4	15	2400	599	3·9
					tons.					
4-in. Q.F.	4	10·16	50	51	2·6	15	33	2900	1924	6·8
4·7-in. Q.F.	4·7	12	48·5	50	3·9	14	45	2800	2445	7·2
5-in. Q.F., No. 1 ‡	5	12·7	45·1	46·3	3·4	9·5	45	2200	1510	5·2
5-in. Q.F., No. 2	5	12·7	45·1	45·9	3·4	14	55	2600	2577	7·1
5-in. Q.F., No. 3 §	5	12·7	50	51·1	4·6	27	50	2900	3207	7·7
6-in. Q.F., No. 1 §	6	15·24	41	42·3	6·1	16	100	2200	3355	7·5
6-in. Q.F., No. 2	6	15·24	44	45	7·1	20	100	2500	4333	8·8
6-in. Q.F., No. 3	6	15·24	50	51·5	7·9	46	100	2900	5830	10·6
8-in. Q.F., No. 1	8	20·32	45	46·5	16·6	90	250	2500	10,833	13
8-in., No. 2 ‡	8	20·32	32	35	9·6	83	300	2300	10,528	13·2
10-in., No. 1 ‡	10	25·4	34·7	36·7	30	140	575	2300	21,086	17·2
10-in., No. 2	10	25·4	40	41·4	32	140	500	2500	21,665	17·5
10-in. Shell Gun	10	25·4	28·2	30	13	100	400	2200	13,420	13
12-in. ‡	12	30·48	35·3	36·9	51	240	1000	2300	36,671	21·7
12-in. Mortar ‡ ‖	12	30·48	10	11·76	13	59	830	1325	9736	9·5
18-in. Shell Gun	18	45·72	28	29.3	60	400†	2000	2250*	70,185	25·3

Guns from 3 inches to 6 inches fitted with either a metallic cartridge case or a Debange pad.

* This velocity is reached, allowing the usual factor of safety for the gun. With an 1830-lb. explosive shell (500 lbs. of wet gun-cotton), a velocity of 1980 foot-seconds was reached with 8·2 tons pressure.

† 75 per cent. cellulose, 25 per cent. nitro-glycerine.

‡ U.S. Army type.

§ U.S. Navy type.

‖ These mortars have been found very accurate at ranges up to 10,000 yards, when fired at obscured targets representing a ship's deck.

Table Relating to Conversion of Measures.

Length.

Metric to English. — English to Metric.

I. Mètres.	II. Yards.	III. Feet.	IV. Inches.	V. Yards.	VI. Mètres.	VII. Feet.	VIII. Mètres.	IX. Inches.	X. Centimètres.
1	1·0936	3·2809	39·37	1	0·91438	1	0·30479	1	2·5400
2	2·1873	6·5618	78·74	2	1·82877	2	0·60959	2	5·0799
3	3·2809	9·8427	118·11	3	2·74315	3	0·91438	3	7·6199
4	4·3745	13·1236	157·48	4	3·65753	4	1·21918	4	10·1598
5	5·4682	16·4045	196·85	5	4·57192	5	1·52397	5	12·6998
6	6·5618	19·6854	236·22	6	5·48630	6	1·82877	6	15·2397
7	7·6554	22·9663	275·60	7	6·40068	7	2·13356	7	17·7797
8	8·7491	26·2472	314·97	8	7·31507	8	2·43836	8	20·3196
9	9·8427	29·5281	354·34	9	8·22945	9	2·74315	9	22·8596

Explanation.—To convert any number from one measure to the other, take the values of the different multiples of 10 by shifting the position of the decimal point, and add together. Thus, find the number

of yards in 2354 mètres (see cols. I. & II.).	of feet in 12·4 mètres (see cols. I. & III.).	of inches in 30·5 centimètres (see cols. I. & IV.).	of mètres in 1026 yards (see cols. V. & VI.).	of mètres in 1742 feet (see cols. VII. & VIII.).	of centimètres in 17·72 ins. (see cols. IX. & X.)
mètres. yards.		Note, 1 m.=100 cm.		feet. mètres.	inches. cms.
2000=2187·3	mètres. feet.		yards. mètres.	1000=304·79	10·0 =25·400
300= 328·09	10 =32·809	cms. inches.	1000=914·38	700=213·36	7·0 =17·780
50= 54·68	2 = 6·562	30·0=11·811	20= 18·29	40= 12·19	0·7 = 1·778
4= 4·37	0·4= 1·312	·5= ·197	6= 5·49	2= 0·61	·02= ·051
∴ 2354=2574·44	∴ 12·4=40·683	∴ 30·5=12·008	∴ 1026=938·16	∴ 1742=530·95	∴ 17·72=45·009

Note.—A ready way of approximately converting all French measures into English inches is to multiply by 4 and apply the decimal point by common sense—Thus for a 15-cm. gun; 15 × 4 = 60. Now this Calibre cannot be 60 inches, nor can it be 0·6 inch; therefore it must be 6 inches. (The exact value is 5·906 in.)

Weight.

Metric to English. — English to Metric.

I. Kilo-grammes.	II. Tons.	III. Pounds Avoirdupois.	IV. Grains Troy.	V. Tons.	VI. Milliers.	VII. Pounds Avoir-dupois.	VIII. Kilo-grammes.	IX. Grains. Troy.	X. Gramme.
1	·000984	2·2046	15432·3	1	1·016	1	0·4536	1	·0648
2	·001968	4·4092	30864·7	2	2·032	2	0·9072	2	·1296
3	·002953	6·6139	46297·0	3	3·048	3	1·3608	3	·1944
4	·003937	8·8185	61729·4	4	4·064	4	1·8144	4	·2592
5	·004921	11·0231	77161·7	5	5·080	5	2·2680	5	·3240
6	·005905	13·2277	92594·1	6	6·096	6	2·7216	6	·3888
7	·006889	15·4323	108026·4	7	7·112	7	3·1751	7	·4536
8	·007874	17·6370	123458·8	8	8·128	8	3·6287	8	·5184
9	·008858	19·8416	138891·1	9	9·144	9	4·0823	9	·5832

Explanation.—To convert any number from one measure to the other, take the values of the different multiples of 10 by shifting the position of the decimal point, and add together. Thus, find the number

of tons in 35 milliers (see cols. I. & II. Note, 1000 kg. =1 millier).	of pounds in 56·3 kilo-grammes. (see cols. I. & III.).	of grains in 120 grammes (see cols. I. & IV. Note, 1000 grms. = 1 kg.)	of milliers in 38 tons (see cols. V. & VI.).	of kilogrammes in 68 pounds (see cols. VII. & VIII).	of grammes in 85 grains (see cols. IX. & X.).
milliers. tons.	kgrms. lbs.	grammes. grains.	tons. milliers.	lbs. kgs.	grains. grammes.
30 = 29·53	50 =110·231	100=1543·23	30 = 30·48	60 = 27·216	80 = 5·184
5 = 4·92	6 = 13·228	20= 308·65	8 = 8·13	8 = 3·629	5 = 0·324
	0·3= ·661				
∴ 35 = 34·45	∴ 56·3=124·120	∴ 120=1851·88	∴ 38 = 38·61	∴ 68 = 30·845	∴ 85 = 5·508

Note.—7000 grains troy = 1 pound avoirdupois.

PART IV.

STATISTICS, OFFICIAL STATEMENTS AND PAPERS.

Statement explanatory of Navy Estimates, 1902-1903.

THE Estimates for 1902-1903 amount to £31,255,000, as opposed to £30,875,000 for the current year.

Administration.

The Admiralty has been expanding concurrently with the general expansion of the Navy, and it is one of the most important duties of the Board to supervise this expansion and to see that it takes place on sound lines. The dangers to be guarded against are excessive centralisation, imperfect devolution of responsibility for details on subordinate officers, and the consequent overburthening of the higher officials, who ought to reserve their strength for the main direction of administration—the consideration of principles and improvements in the Service. Most important of all, the development of the peace administration must be on such lines as make for efficient war administration. The Board are keenly alive to the importance of this aspect of the question.

Considerable changes have taken place, or are in contemplation, in connection with the Controller's Department. The general object which the Board have had in view has been, as far as possible, to relieve the Controller of all work not directly connected with the construction, reconstruction, and repair of ships, or the management of dockyards; and similarly to relieve the Director of Naval Construction of all work not directly connected with the designing of ships and the superintendence of their construction in accordance with the designs. The authority of Admirals Superintendent of Dockyards has been increased and their power enlarged, with the object of diminishing the number of references to the Admiralty. To the great regret of the Board, Sir William White, K.C.B., has been obliged through ill-health to resign the post of Director of Naval Construction, which he has filled for 16 years with conspicuous ability and success, and in the memorable work in which he has been constantly supported by the efficiency and zeal of the officers of the Royal Corps of Constructors of which he has been the chief.

Mr. Philip Watts, of the Elswick Works, formerly an officer of the Royal Corps of Naval Constructors, has been appointed to succeed him.

The Naval Ordnance Department has been formed into a separate branch of administration, and is no longer a sub-branch of the Controller's office. Colonel Sir Thales Pease, K.C.B., who has inaugurated and administered the Naval Ordnance Store Department with signal success, is, I regret to say, shortly retiring. The Naval Ordnance Store Department will henceforth become an integral sub-branch of the Naval Ordnance Department, under an officer to be designated "Superintendent of Ordnance Stores."

The Department of the Director of Works has been largely augmented, the position of the officers improved, and the authority of the Director of Works increased.

No large changes have taken place since last year in the other Departments of the Admiralty, which are working smoothly and efficiently.

In the Naval Intelligence Department the permanent number of Naval Attachés has been increased to five.

Personnel.

It does not appear to be fully understood by the Service or the public generally that by the constitution of the Board of Admiralty the sole responsibility for promotions rests with the First Lord, who, however, in the performance of the difficult and invidious but most necessary task of selection is accustomed to consult his naval colleagues, and to discuss freely with them the comparative merits of the different officers eligible for promotion. I mention this because the average age of Captains on promotion to the rank of Rear-Admiral has considerably increased of late years, and I consider that the absence from the Flag List of a due proportion of younger officers is a matter of serious moment, and because I recognise that I am specially responsible for devising a remedy for the future.

Much attention has, for some time past, been paid by writers on naval matters to the question of the education of the officers of the Navy. I am glad that this is so, because, important as the *matériel* of the Navy is, the *personnel* is much more important. Thoroughly efficient officers and men will always make the best of any *matériel* entrusted to them. No ships, however excellent, will effect anything in the hands of an inefficient *personnel*. The criticism levelled at the present system of training officers in general is that it is not based on one continuous systematic plan, but is the result of a series of independent decisions; in particular, it falls under two heads:

that the officers are not sufficiently at sea, and that the subjects of the courses at Greenwich are not well chosen or arranged. As regards the general criticism, it is, of course, true that the present system of education is, like everything else in the Navy, a gradual growth of time, and not a scheme of one man or of one committee, but I do not admit that it is not coherent. I would say in respect of this, as well as of the particular objection to the Greenwich courses, that the system, judged by its results—the excellence of the officers trained under it—is a good one. Improvements in it there may well be, or a better one may be devised, and the light which criticism sheds on the subject can do nothing but aid the Board in this matter, which is not a simple but a difficult one, and one in which mistakes are more easily made than afterwards rectified. It is far too big a subject to attempt to deal with in the scope of this Memorandum.

It has been assumed that the Council of Naval Education are the authority responsible for naval education, but this is not so. The Board themselves are the responsible authority, and the Council of Naval Education simply assist when referred to. The inquiry promised last year has been carried out by the Council, and they have recommended some changes in the system, to which the Board have given their approval. One of some importance is in connection with the courses for gunnery and torpedo lieutenants. At the end of the first term the mathematical class is divided after a test examination, so as to enable those showing special aptitude to push forward their studies, whilst the remainder are given more time to devote to careful grounding, and it is also provided that more attention shall be given to voltaic electricity and its practical application in the course in physics. Proficiency in foreign languages certainly requires further encouragement, but at a period when Lieutenants are constantly employed it is difficult to provide opportunities for study abroad after a young naval officer has once entered the Service. Officers who have qualified have been and are being appointed as interpreters, and receive extra pay as such, while a special instructor in French is being appointed for the tuition of the midshipmen of the ships of the Channel Squadron.

As regards the particular criticism of insufficient sea-training, I think the following figures show that there is no ground for alarm on this score. I cannot admit that midshipmen should be excluded from the comparison. The fact that for the first years of his service the young naval officer is continuously at sea is, at any rate, one of great importance in his naval education, and if those early years were spent on shore I do not think that a notice of the fact would be omitted from any indictment of the system of his education.

On December 31, 1901.	Captains.	Commanders.	Lieutenants.	Supply Lieutenants.	Sub-Lieutenants.	Midshipmen.	Total.
Serving in sea-going ships	101	145	718	112	154	679	1909
Employed on shore	54	116	192	18	—	—	380
On passage	3	2	26	2	—	—	33
At College, on Excellent, Vernon, &c.	12	10	73	—	190	—	285
Other Government service	—	2	4	—	—	—	6
Full pay leave, or waiting* employment	29	29	23	1	7	15	104
Not wishing employment for private reasons, sick, &c.	5	5	35	1	3	11	60
Total	204	309	1071	134	354	705	2777

* Many of these were appointed to ships in the first fortnight of January.

Last year an advanced course in Naval History, Strategy, Tactics, and International Law was commenced at Greenwich for the senior officers of the Fleet. Excellent work was done in the first session of this course, and I look to the future for its steady and continuous development. If the minds of naval officers are as a result turned to a more constant and thorough study of naval problems it will have fulfilled the main object the Board had in view in its foundation.

The numbers voted for the current year were 118,625 Active Service ratings. It is expected that the establishment will have been reached by the end of the financial year, as recruiting has been good. The numbers proposed for next year are 122,500. The increases will consist of the following ranks and ratings:—

Officers	266
Warrant officers	143
Seamen	1500
Artizans and electricians	250
Engine-room artificers	150
Stokers	1000
Miscellaneous	400
Boys (shipwrights and coopers)	166
Total	3875

The recommendations of the Committee on Navy Rations have been adopted, but the new system cannot be introduced simultaneously on all stations till the necessary reserve stocks have been created. It will commence during the year 1903, but the exact date cannot be notified until next year.

The increase of the Reserves has not kept pace with that of the Active Service ratings, and it has been decided to appoint a Committee, constituted as follows:—

Sir Edward Grey, Bart., M.P., Chairman,
J. Clark-Hall, Esq., Registrar-General of Seamen,
Rear-Admiral R. F. H. Henderson, C.B.,
Sir Alfred Jones, K.C.M.G.,
Commodore The Hon. H. Lambton, R.N., C.V.O., C.B.
Sir Francis Mowatt, G.C.B.,
Admiral Sir Edward Seymour, G.C.B.,
Secretaries—Lieutenant-Colonel G. G. Aston, R.M.A.,
Fleet-Paymaster C. E. Gifford, R.N., C.B.,

to consider how far the Manning of the Navy may be supplied and the Active Service ratings supplemented by Naval Reserves. The terms of reference, which I append, include, among other things, the proposal for the establishment of a Naval Volunteer Reserve.

For the reasons I stated in a speech on the subject last session, it has been decided not to build ships for the establishment of a new Training Squadron. If the Board had believed that service in masted ships was essential for the proper training of the seamen of the Fleet, a new Squadron of Sailing Ships would have had to be provided, however difficult and inconvenient. I desire that there should be no ambiguity on this subject, and therefore state plainly that the Board do not consider exercise with masts and yards to be essential for the proper training of the officers or seamen of the Fleet, and that henceforth it is abandoned as a necessary part of their education after they have left the training ships. The brigs are retained for the boys in connection with the training ships, and the cruiser is used in the Mediterranean as an adjunct to the training of the seamen, because practice in masts and yards is excellent both for mind and body. This no one doubts; the question is, is it an essential factor in the sea-training of a modern naval officer or seaman, in order to make him the perfect instrument of warfare which he should be? It is that question which the Board answers in the negative, and the occasions on which, in their opinion, such training is permissible and valuable are those on which it does not displace any part of that training which is essential or conflicts with the exigencies of the Service in the manning and commissioning of fighting ships. If I am asked what is essential, I would reply all sea knowledge which is necessary for the management of modern vessels of war and their boats under all conditions, and gunnery and torpedo work in all its branches. Further, I believe that the training of the modern seaman should more and more adapt itself to the

peculiar characteristics of the ships he has to man. As oars gave place to sails, so sails have yielded to engines, and timber to metal. The training of the seaman should, therefore, be directed towards a knowledge of the structure and machinery of a modern man-of-war, and capacity and handiness to deal with and repair it. Gunnery, however, is the most important of all, and in gunnery the emulation between H.M. ships is becoming very keen. But our seamen and marine gunners must be able to shoot straight at long as well as at medium ranges; they must be able to hit their target with the guns trained in any direction in which they will bear; and, above all, they must never become fair-weather gunners. Emulation, therefore, must not be allowed to lead to a restricted selection of conditions and weather for target practice.

The Board have great pleasure in announcing that Her Majesty Queen Alexandra has identified herself with the Navy by consenting to become President of the Naval Nursing Service, and to give it her name. The whole Navy, and the Medical Branch in particular, will keenly appreciate this gracious act. The recent changes in the conditions of service and pay of the Medical Officers of the Army necessitated an immediate revision of the position of the Medical Officers of the Navy. Fresh regulations will shortly be issued giving details of a substantial improvement of pay.

Construction and Reconstruction.

All the money voted for new construction for the year 1901–2 will have been earned and spent by March 31. The amount proposed in the Estimates for 1902–3 for new construction is £9,058,000, of which £700,000 will be devoted to the commencement of new vessels. The corresponding amounts for the current year were £9,003,000 and £537,000 respectively.

The Committee on the Causes of Past Arrears in Shipbuilding, the appointment of which was announced last year, has only just completed its labours, and the Board have had no opportunity as yet of considering its report. The report will, with as little delay as possible, be laid before Parliament.

I should like to take this opportunity of making a few observations on the subject of construction. It appears to me that what matters is, not the date at which ships are commenced, but the date at which they are completed and ready for commission. The hull, the engines, the armour, the guns, and the gun-mountings must be timed for delivery so that the progress of the ship to completion is never delayed. The complete ship, however, is not a net addition to the

strength of the Navy unless the *personnel* is sufficiently strong to man her. While the Fleet is increasing the increase of the *personnel* must proceed *pari passu* with that of the *matériel*, but there is no good and much evil in attempting to increase the *personnel* at a rate which outstrips the supply of boys and men of the best quality. What is required is to know exactly how many ships of each class are wanted and by what dates, and to arrange for their commencement accordingly. It is not always possible to commence ships at the end of the financial year consistently with their completion at the required time, but I am clear that there is often a substantial administrative convenience in doing so. The consideration of new designs, or the improvement of existing designs, is a long and anxious task, and when a decision has been arrived at it takes months before the sketch designs can be worked out in every detail so that the dockyards or contractors can build to them. The preparation of the Estimates is such a tax upon the time of the Board during the latter half of the financial year that the earlier portion of the year is clearly indicated as that in which this all-important question can be most conveniently studied. It follows that the consequent labour of working out the designs in detail brings us towards the end of the financial year, and if ships are laid down then there should be no check or delay in their subsequent construction.

I am also of opinion that, when it is possible consistently with the requirements of the Navy, there is a great administrative advantage in a steady and constant, as opposed to a fluctuating, vote for new construction.

Between April 1, 1901, and March 31, 1902 inclusive, the following ships will have been completed and passed into the Fleet Reserve:—

Battleships: Formidable, Implacable, Irresistible, Bulwark, Vengeance.

Armoured Cruisers: Aboukir, Cressy, Hogue, Sutlej.

First-class Cruiser (Protected): Spartiate.

Third-class Cruiser (Protected): Pandora.

Royal Yacht: Victoria and Albert.

Sloops: Mutine, Rinaldo, Espiègle, Fantôme.

River Steamers: Teal and Moorhen.

Twenty-two *Destroyers*, 4 *Torpedo Boats*, 5 *Submarines*.

On April 1, 1902, there will be under construction:—13 battleships, 22 armoured cruisers, 2 second-class cruisers, 2 third-class

cruisers, 4 sloops, 2 auxiliary vessels, 10 destroyers, and 5 torpedo boats; and it is expected that between April 1, 1902, and March 31, 1903 inclusive, the following ships will have been completed and passed into the Fleet Reserve:—5 battleships, 7 armoured cruisers, 2 sloops, 2 auxiliary vessels, and 2 destroyers. It is proposed to commence during the financial year 1902–1903:—2 battleships, 2 armoured cruisers, 2 third-class cruisers, 4 scouts, 9 destroyers, 4 torpedo boats, and 4 submarines.

The following plan of reconstruction has been decided upon, and great progress will be made with it during the ensuing year. *Battleships:*—Royal Sovereign class: the 6-in. guns on the upper deck will all be put into casemates. Barfleur and Centurion: all the 4·7-in. guns will be taken out and replaced by 6-in. guns in casemates. *Cruisers:*—Powerful and Terrible: four 6-in. guns in casemates will be added to the armament of each of these cruisers. Arrogant and Talbot classes, comprising 13 ships: all the 4·7-in. guns will be taken out and replaced with 6-in. guns.

That the repairs to ships in the Dockyard Reserve should be promptly executed, and that the ships themselves should be rapidly passed into the Fleet Reserve, is a matter of great importance. There is no doubt that there has lately been some congestion of this work in the Dockyards, and in order to effect a radical cure it has been decided, when convenient, to utilise also the private yards where ships were built for the purpose of their repairs.

When destroyers were first designed it was not contemplated that they would be frequently used otherwise than as working from a fixed base. Experience, however, has shown that vessels with greater sea-keeping power are required for service with fleets, and accordingly the Board have decided both materially to strengthen the type of future destroyers, and also to create a new class altogether, to which the name "scout" has been given. It is proposed not to initiate a design for this new class at the Admiralty, but to invite the private shipbuilders of the country to give the Navy the benefit of their creative ingenuity by submitting designs to fulfil certain stated conditions. Moreover, a Committee, consisting of Vice-Admiral Sir H. Rawson, K.C.B. (President), Mr. John Inglis, LL.D., Professor J. H. Biles, Mr. A. Denny, and Mr. H. E. Deadman, has been appointed to advise the Admiralty in respect of the strengthening of some of the existing vessels. The Board have often been urged to build large numbers of destroyers at the same time, but this advice I do not believe to be sound. In the first place, the destroyer is a type which is still in process of rapid evolution; in the second place, it must by its nature be a short-lived

type of vessel, and to build large numbers in the same year would inevitably result in large numbers becoming obsolete and worn out at the same moment. The true policy seems to me to be steady—as opposed to spasmodic—construction. Henceforward Sheerness will be gradually more and more used as the special dockyard at which destroyers will be repaired.

Auxiliary Vessels.

It is often assumed in argument that there is no doubt as to the number of auxiliary vessels that will be required in war, or as to the exact type they should be, or as to the use to which they could be put. As a matter of fact this is not so, except in so far that the Board have fixed exactly the number of auxiliary vessels that, according to their present experience, would be required in time of war. In all organisations there are two classes of instruments which will be required in time of war—the class which cannot be improvised, and which must be fully created in time of peace, and the class which can be improvised speedily on the outbreak of war, if proper preparation has been made in time of peace. This is true of auxiliary vessels. Certain auxiliary vessels can, if every preparation has been made beforehand, be taken up from the Mercantile Marine immediately on the outbreak of war. There are others which must be created in time of peace. Although hospital ships belong to the former class they may be very useful also in time of peace with large fleets, as has been exemplified in the case of the Maine (the generous gift of Mr. Baker, a citizen of the United States), which is now serving in the Mediterranean. As regards the latter class, we and all other nations are still in the experimental stage. As I said last year, in the case of colliers the policy of the Board has been by continual chartering to induce private owners to build as many vessels as possible which are thoroughly suited for the needs of the Fleet. I will take another case as an example—depôt ships for destroyers. A different class of ship is required, accordingly as the destroyers are or are not acting from a fixed base—opinions differ also in the latter case as to the exact use to which these vessels can be put. One class of depôt ship is being prepared for the flotillas at the home ports, and the Leander is being prepared as a depôt ship for the destroyers in the Mediterranean. From this experience we shall learn more clearly what is exactly required; but if the new "scout" class is a success, these depôt ships should not be wanted for them to the same extent. Again, in the case of distilling ships, one has been bought and fitted which should be on service within the

year, and experiments have been made with others; but obviously it will be far better if, by improvements in the boilers, ships are able to distil their own water and can be made independent of auxiliary distilling vessels. This brings me to a consideration of the question of the type of boiler to be adopted for the future use of His Majesty's Fleet.

The interim report of the Boiler Committee has been laid before Parliament, as also the report of the trials of the Minerva and Hyacinth. The final report has not yet been presented to the Board, because the Committee has not yet brought its experiments to a conclusion. Every facility for which the Committee have asked in connection with these experiments has been granted, and every type of boiler of which they recommend the trial is being fitted into ships now under construction.

The country has had to deplore the wrecks of H.M.S. Viper and Cobra during the past year, accompanied in the latter case by a lamentable loss of life. One result has been—for the present—to put a stop to our experience with the turbine system of machinery, but the Board are negotiating for a renewal of the experiment in two more destroyers and in one third-class cruiser.

Meanwhile the question of the use of oil fuel is being very carefully studied, and experiments on a thorough scale are being pushed forward under the superintendence of an engineer officer specially detailed for this duty.

Distribution of the Fleet.

The distribution of the commission Fleet among the various stations of the globe is a product of time. The present distribution has been gradually evolved in accordance with the peace as well as the war requirements of the empire. I use the term "peace" in contradistinction to a state of naval war only, and I may say that these peace requirements have, as the empire has expanded, become more and more exacting. The origin of the present principle of distribution was in a period when wind, not steam, was the motive power; and when the electric telegraph was unknown. With the changes brought about by steam and the electric telegraph the actual distribution has gradually changed, and adaptability to the needs of the time, and not finality, is the spirit in which the question must be viewed.

At the present moment the position is as follows:—It has been possible to withdraw from the China Squadron some of the additions which were sent there under the stress of the emergency of the year 1900, and the last of the cruisers lent to the Cape has returned to

the Mediterranean; but, speaking generally, it was only with difficulty that during the past year the North American, Cape, China, and East India Squadrons were able to carry out their arduous duties with the strength allotted to them. The question of the future composition of the Australasian Squadron will be discussed with delegates from the Australian Commonwealth and New Zealand during the course of this year. The Pacific and South American Squadrons are being reduced to three cruisers and one sloop and one cruiser and sloop respectively. At home the Cruiser Squadron is now at its complete strength in numbers, but during the year its strength in quality will be augmented by the substitution of armoured for two of the present protected cruisers.

To this and the experience which will be gained from its work, both by the officers and men, the Board attach great importance; it is fully recognised that the work which our cruisers will have to perform in war requires constant practice and study. The manœuvres in the Channel last year significantly marked this fact, and the idea of the subsequent exercises in the Mediterranean lends itself to a continuance of the lessons then taught. In respect of the battleships, the policy of the Board is gradually to change the composition of the Home, Channel, and Mediterranean Squadrons, so that, like the China Squadron, they shall be composed of homogeneous classes of battleships. While the recurrent cruises of the Home, Channel, and Cruiser Squadrons will take place as usual, the manœuvres of this year will not take place in home waters, but will be carried out by a combination for the occasion of the Mediterranean Fleet with the Channel and Cruiser Squadrons.

I append the usual statement in respect of the work done in the past year by the various departments of the Admiralty.

SELBORNE.

February 10, 1902.

STATEMENT OF WORK, 1901–1902, &c.

Mobilisation.

Enrolment in the new Royal Fleet Reserve, referred to in last year's statement, commenced on March 1, 1901, and up to the end of December, 1901, the total number of seamen, stokers, and marines entered was:—

In class A	1833
In class B	1466
Total	3299

Class A is formed of pensioners.

Class B consists of men who had left the service, and so were formerly lost to the Navy; these are, therefore, a real addition to the manning resources. It is hoped to bring this latter class up to 2000 before the end of the financial year.

A considerable number of stokers are at present employed in the Dockyard Reserves at the home ports, cleaning and attending ships which are being brought forward for commission. So long as the numbers available permitted, this course was unobjectionable, but the expansion of the Fleet in Commission and the increased engine power of modern ships has entailed a demand for engine-room ratings beyond the normal increases to the Vote. It is, therefore, proposed to employ civilian labour in the Dockyard Reserves, thus releasing a considerable number of stokers for sea service.

Composition of Fleets.

Various changes in the Fleet in Commission have been made. The Cruiser Squadron has been increased by two second-class cruisers, the Brilliant and Rainbow.

In the Mediterranean Squadron the Implacable has relieved Empress of India, and the Formidable has been transferred to the station from the Channel Squadron.

The Irresistible will commission in February to relieve Devastation.

Eight additional destroyers have been sent to the station.

The process of relieving the Coast Guard and Port Guard ships by more modern vessels was continued during the year. The Revenge has relieved the Alexandra, the Empress of India the Howe, and the Resolution the Colossus.

In the China Squadron the Albion and Cressy have relieved the Centurion and Barfleur. Two additional river boats, Teal and

Moorhen, have been sent out. Several of the vessels transferred to this station last year have since returned to their stations or returned home.

A first-class cruiser and two destroyers have been attached to the Gunnery Schools at Portsmouth and Chatham, in lieu of several of the old gunboat tenders, in order to give sea-going training in gunnery to a larger number of men; a similar addition will be made at Devonport.

The old first-class cruiser Nelson has been attached to the depôt at Portsmouth to provide additional accommodation and training for stokers.

Training.

The number of vessels and torpedo boats taking part in the Naval Manœuvres in 1901 was 162, of which 66 ships and 20 torpedo boats were specially commissioned, manned by 33,153 officers and men. The total number of Coast Guard embarked was 38 officers and 1637 men, and of Royal Naval Reserves, 34 officers, 231 seamen, and 83 firemen.

During September the Channel and Mediterranean Squadrons were combined at Gibraltar for a fortnight's Fleet exercises, under the command of the Commander-in-Chief, Mediterranean.

A revision of the system of training men in gunnery and torpedo duties has been made with a view to enabling larger numbers to be qualified; the changes include the establishment of a new non-substantive rating of "second captain of gun." Opportunity was taken to re-adjust the allowances paid for qualification in gunnery and torpedo duties. These allowances have also been made continuous.

The Royal Marines.

The establishment of the Royal Marines was raised on April 1, 1901, from 18,800 to 19,800, to meet which increase, and to replace waste, 3541 recruits were raised; the corps is now within a small number of its new establishment, and notwithstanding the continued waste caused by the disturbing elements in the recruiting for the last year, there is every prospect of the full number being reached by March 31.

The arrangement made last year for the employment of marines as captains of guns has been further extended. Infantry as well as artillery will be called upon in future to provide as necessary both captains and second captains for gun duties, receiving the extra pay of the position on their passing the qualifying course.

Proposals are now under consideration for placing the gunnery pay of marines on an approximately equal footing with that of seamen, in order to induce the best men to still further improve their efficiency in gunnery.

Naval Reserves.

The Coast Guard and Port Guard ships were regularly assembled three times last year for Fleet exercises, target practice, &c., viz.:—In March for spring cruise of three weeks' duration. In July for manœuvres. In October for autumn cruise of three weeks' duration.

These arrangements have given very good results as regards general efficiency, and the vessels are now in all respects fully manned sea-going ships.

Wireless telegraph apparatus has been fitted at six stations, and it is proposed to fit four more, making ten in all, round the coast. These stations are to be kept manned all the year round and be worked by the Coast Guard.

In order to make the crews of all the signal stations more efficient and accustomed to their special work, they have been placed in a separate section, called the "signal section." They will embark, a half section at a time, in the Coast Guard ships during the spring and autumn cruises for drill and signal instruction.

The establishment of 1500 officers, R.N.R., is complete, comprising—

Lieutenants	482
Sub-lieutenants	494
Midshipmen	524

There are 378 qualified candidates on the list of applicants.

The numbers now undergoing naval training in H.M. ships are—

	Lieuts.	Subs.	Mids.	Total.
12 months' training	20	53	5	78
G. and T. courses	7	9	4	20

Two hundred and sixty-one officers on the active list have already undergone this training, and are in receipt of training fees.

The establishment of engineer officers is also complete, viz.:—

Senior engineers	70
Engineers	179
Assistant engineers	151
	400

There are 55 qualified candidates on the list of applicants for appointment.

The instructional courses for these officers continue to be held three times a year for three months each. The number allowed per annum has been increased from 18 to 54.

The following officers have completed or are now undergoing courses—

Senior engineers	16
Engineers	45
Assistant engineers	12
	73

The number of seamen, R.N.R., borne on December 31, as compared with those voted for 1901–1902 and former years, are—

Class.	Number Voted 1901-2.	Numbers Borne.		
		31.12.01.	31.12.00.	31.12.99.
Qualified seamen . . .	11,700	3485	2937	2080
1st class, old system . .		7106	7978	8921
Seamen	11,300	4973	4218	3406
2nd class, old system .		5063	5996	7555
Totals	23,000	20,627	21,129	21,962

The numbers, which had been gradually falling off, have begun to increase since August, 1901. This increase may be attributed to the new conditions of enrolment and naval training referred to last year, which came into force on 1st July last, and which give good promise of being successful in increasing the popularity of the service.

Eight hundred and twenty-seven R.N.R. men were embarked for naval training during the year, and 529 were actually embarked at the beginning of this year.

The number of firemen borne compare as follows:—

31.12.01	3714
31.12.00	3530
31.12.99	3494

An alteration in the rules was made in 1901 whereby firemen need not serve actually in sea-going ships after their first period of

five years' enrolment. Many men get employment as firemen in river steamers, tugs, factories, &c., who are now able to re-enrol under the new conditions. The increase in numbers which has recently taken place is attributed to this, and provision has been made for 3800 for next year.

Greenwich Hospital.

It has been decided that pensions and allowances may be granted from naval funds to the widows and children of seamen and marines whose deaths are attributable to warlike operations, on the same scale as that sanctioned for the Army. This will relieve Greenwich Hospital funds, which will, however, as before, remain charged with the provision for pensions, &c., to widows and children of those whose death has been caused by other exigencies of the service.

Coaling of the Fleet.

Progress is being made with the coaling schemes for which provision was made in the Naval Works Act, 1901.

The provision of a large floating depôt for use at a home port is being dealt with, and other proposals are under consideration which will add to the accommodation and resources of several naval stations.

Additional craft fitted with modern appliances are under construction, and provision for further craft has been included in the Estimates for 1902–1903.

Trials of apparatus for coaling His Majesty's ships at sea are in progress, but sufficient test has not yet been made to speak with certainty as to the results.

The shipment of coal mined at Westport (New Zealand) to the China Station has been considerably increased, and a well-equipped transport collier has been engaged exclusively for this service.

Reserve stocks of patent fuel have been deposited at the several naval depôts abroad, and further shipments will be made during the year 1902–1903.

NEW CONSTRUCTION.

The work on new construction during 1901–1902 has proceeded with great activity.

The Vote for New Construction for the year was greater than that for any preceding year, and the expenditure during the year will somewhat exceed the Vote.

The rate of progress referred to last year as having greatly increased during the latter part of 1900–1901 has been well maintained during the present financial year, both as regards armour and machinery.

The expenditure on armour, which in 1900–1901 was chiefly confined to the latter part of that year, has been much more nearly uniform during the present financial year. The sum provided for armour during the current financial year was £2,249,000, and it is expected that the whole of this sum will be earned.

Battleships.

The Albion, which was delayed in completion owing to the financial failure of the contractors for her machinery, has been commissioned.

The Vengeance, the last vessel of the Canopus class, which was detained at Barrow for a long period owing to an accident to the dock entrance at that place, has been delivered at Portsmouth, and is expected to be passed into the Fleet Reserve before the end of the financial year.

Three vessels of the Formidable class, viz., Formidable, Implacable, and Irresistible, have been completed and commissioned.

It is expected that the Bulwark will be commissioned during the present financial year. The London and Venerable of this class will be completed in 1902–1903. The Queen and Prince of Wales, two similar ships, will be completed in 1904–1905.

The trials of the completed vessels of this class have been carried out with very successful results. The speeds obtained on trial were slightly in excess of the estimated speed as designed.

Of the six vessels of the Duncan class it is expected that the Russell will be delivered from contractors in March next, and she will be then completed for passing into the Fleet Reserve. In addition, it is expected that the Duncan and Cornwallis will be completed during 1902–1903.

The three remaining vessels of the class, viz., Albemarle, Montagu, and Exmouth, will be passed into the Fleet Reserve in 1903–1904.

The Estimates for last year provide for laying down two powerful armoured vessels, to be known as the King Edward VII. class, in H.M. dockyards, and for building a similar vessel by contract. In order to admit of the more rapid prosecution of work in the dockyards it has been decided to lay down only one of these vessels in a Royal dockyard, and to build the other two by contract.

As compared with the battleships of the London class these vessels have a more powerful armament, stronger defence, and somewhat higher speed.

Armoured Cruisers.

There are now 26 vessels of this class, viz. :—

Cressy class	6
Drake class	4
Monmouth class	10
Modified Monmouth class, to be known as the Devonshire class	6

The Cressy, the leading vessel of this type of cruiser, was commissioned in May last. So far as experience has been gained, the vessel has fully realised what was expected of her at the time of her design.

Four other vessels of the Cressy class, viz., Aboukir, Sutlej, Bacchante, Hogue, have been delivered from the contractors, and will shortly be completed.

The speeds of these five vessels are from ½ to ¾ knot in excess of the 21 knots as designed.

The Euryalus, which met with an accident arising from fire at Messrs. Vickers' works at Barrow, and on being taken to Messrs. Laird's yard at Birkenhead, for the purpose of repair, met with a further accident on being docked, is being pressed forward, and it is expected that the vessel will be delivered in time to be passed into the Fleet Reserve early in 1903–1904.

The Good Hope, of Drake class, has been received from the Fairfield Yard, and is about to undergo her steam and other trials. This vessel has been delivered inside the contract time for delivery, as was the Cressy, built by the same firm. The Drake, building at Pembroke, will leave that yard in February to be completed at Portsmouth. The Leviathan will leave the Clyde in March next for completion at Portsmouth. The King Alfred, building at Barrow, is expected to leave in June next. Of the ten vessels of the Monmouth class already ordered, it is expected that the Bedford, building by the Fairfield Co., and Kent, building at Portsmouth, will be passed into the Fleet Reserve during 1902–1903. The Essex, building at Pembroke, will be passed into the Fleet Reserve early in 1903–1904. The Monmouth, it is expected, will be delivered from the contractors in the coming autumn, and be passed into the Fleet Reserve in 1903–1904.

The Berwick, Cumberland, Donegal, and Lancaster, it is expected, will be delivered from the contractors early in the financial year

1903–1904, and will, with the Suffolk and Cornwall, be completed and passed into the Fleet Reserve during that year.

Tenders have been invited for five vessels of the modified Monmouth class, for which the names are to be—Argyll, Antrim, Carnarvon, Hampshire, Roxburgh. The Devonshire, which is to give the name to the class, is being built at Chatham. These vessels will be about 400 tons larger than those of the Monmouth class. Their principal armament will be two 7½-in. B.L. guns in two shallow barbettes, instead of four 6-in. B.L. guns; the ten 6-in. in casemates will be repeated. The vessels will be 10 ft. longer and 1 ft. wider than the Monmouth class.

Protected Cruisers.

It is expected that the first-class cruiser Spartiate will be passed into the Fleet Reserve before the 1st April next.

The second-class cruisers of improved Hermes type (Challenger and Encounter) have been advanced during the year, and will, it is expected, be passed into the Fleet Reserve early in 1903–1904.

The third-class cruiser Pandora has been completed and commissioned.

Tenders have been received for two third-class cruisers, to be named Amethyst and Topaze. These tenders are under consideration, and the work on the vessels will be advanced as rapidly as possible.

Sloops and Gunboats.

Eight sloops, viz., Cadmus, Clio, Espiègle, Fantôme, Merlin, Mutine, Odin, Rinaldo, have been under construction during the year, two of which, viz., Mutine and Rinaldo, were built by contract.

The Espiègle, Mutine, and Rinaldo have been commissioned for service. The Fantôme will, it is expected, be completed during the present financial year. The Odin and Merlin will be completed in 1902–1903. The Cadmus and Clio will be advanced in construction during the year.

The two gunboats, Teal and Moorhen, of extremely light draught, have been completed and despatched to China for active service.

Torpedo Boat Destroyers.

The total number of vessels of this class ordered previously to the present year was 113, two of which, however, viz., the Cobra and Viper, have been lost. This is exclusive of the Taku, taken from the Chinese. All of these have now been delivered with the exception of two, viz., the Express and Arab. Of those delivered all have passed

their trials and been accepted except the Success, which has been delayed by the necessity of fitting new propellers; her official trials will shortly be resumed.

The Express and Arab were originally intended to attain a speed of 33 and 32 knots respectively; but after long-continued trials their builders have found it impossible to fulfil this condition. The Express has made satisfactory trials up to 31 knots, and it has been decided to accept her at this speed. She will shortly be delivered. The Arab is now undergoing her steam trials, and it is expected that about 31 knots will be attained. It has been decided to accept the vessel at that speed.

Designs and tenders have been invited for the ten new torpedo boat destroyers of this year's programme. They will be of a modified type, of larger displacement, stronger construction, and with improved accommodation for officers and crew as compared with existing vessels of the class. These modifications will tend to improve the sea-going qualities of the vessels. The official trials will, however, be made at the deep load draft, a speed of 25½ knots under this condition being specified.

Torpedo Boats.

The four torpedo boats of 25 knots speed ordered before the present year have been delivered and, having satisfactorily passed their steam trials, have been accepted and completed for service.

The five torpedo boats, also of 25 knots speed, provided for in this year's Estimates, have been ordered of Messrs. Thornycroft. They will be delivered in February, 1903.

H.M. Yacht.

His Majesty's new yacht Victoria and Albert was completed for service in July last. Her conditions of stability were experimentally determined, and found to be in all respects satisfactory.

On a trial cruise to Gibraltar and back she encountered a considerable sea, when her behaviour was thoroughly tested and favourably reported upon by the commanding officer. In regard to speed, coal consumption, and freedom from vibration, similarly favourable reports have been made.

Fleet Auxiliaries.

The work on the repairing and distilling ship Assistance, and on the distilling ship Aquarius (late Hampstead), has been advanced as rapidly as possible. Both will be completed during the next financial year.

Submarine Boats.

It is hoped that the five submarine vessels ordered from Messrs. Vickers, of Barrow, will be completed this financial year. Preliminary trials have already been made on one of the boats.

Machinery and Boilers.

Between the preparation of last year's statement and March 31, 1901, the battleships Albion and Implacable, and the sloop Mutine, and five torpedo boat destroyers, completed their contractors' trials.

The following vessels have completed their contract steam trials during the present financial year:—

Battleships: Irresistible, Formidable, Bulwark, Vengeance.

First-class Cruisers: Sutlej, Aboukir, Bacchante, Hogue.

Third-class Cruiser: Pandora.

Sloops: Rinaldo, Espiègle, and Fantôme.

Seven *Torpedo Boat Destroyers* and four first-class *Torpedo Boats.*

In addition, it is anticipated that the battleship London and first-class cruiser Good Hope will shortly complete their trials; and that the battleships Venerable, Duncan, and Russell will shortly be ready to commence their trials.

The Espiègle is fitted with Babcock & Wilcox water-tube boilers of the large tube type, which were ordered in October, 1899; and the Fantôme with the Niclausse water-tube boilers, also of the large tube type.

Following the course adopted with the Skipjack and Speedwell, the torpedo gunboats Niger, Gossamer, Jason, and Circe are being re-engined and re-boilered with small tube water-tube boilers associated with light, quick-running engines. The two former are approaching completion, and the work in connection with the Jason and Circe will shortly be commenced.

The third-class cruiser Blonde is being re-boilered with water-tube boilers of small tube type in place of double-ended cylindrical boilers.

Experiments in connection with the use of liquid fuel are being carried out in one of the new boilers of the Blonde erected on shore at Devonport, and in the torpedo boat destroyer, the Surly, at Portsmouth. In the latter vessel the system of assisting the combustion of coal by oil fuel is also being tried. Plans are also being considered of fittings for making further trials of the combination of coal and oil in a Belleville boiler, and also in H.M. ships Hannibal, Mars, and Arrogant in the Channel Squadron.

In consequence of the *ad interim* Report of the Boiler Committee it was decided to replace any of the Belleville boilers that were not too far advanced by the types of water-tube boilers recommended by the above Committee. Consequently the battleship Queen and the first-class cruiser Cornwall are to be fitted with the Babcock & Wilcox type of water-tube boiler, and the first-class cruiser Berwick with the Niclausse type, instead of the Belleville types originally ordered.

The second-class cruiser Encounter will be also equipped with Dürr boilers in place of Belleville boilers for comparison with the Challenger, which will have Babcock & Wilcox boilers; and the Hermes is about to have Babcock & Wilcox boilers fitted in place of the original Belleville boilers.

It was also decided to fit the Medea and Medusa with the Yarrow and Dürr large tube type of boiler.

For the three battleships of the King Edward VII. class about to be commenced, two are to have Babcock & Wilcox boilers, and the third is to have a combination of two-fifths cylindrical and three-fifths Babcock & Wilcox boilers.

The type of boilers for the six armoured cruisers to be laid down this year is not settled.

The Diana and Mars, in the Mediterranean and Channel Squadrons respectively, are being supplied with retarders in their boiler tubes as an experiment, in view of the economy reported by the Boiler Committee to accrue from the use of these fittings.

NEW WORKS.

Works Provided in Estimates.

Chatham.—The new building slip and shops will be completed early in next financial year. One of the old slips, No. 7, is also being lengthened, and will be completed during 1902–1903.

Portsmouth.—The extension of No. 2 Dock has been deferred pending the lengthening of No. 12 Dock, which is urgently required. The work is well advanced.

Devonport.—Rapid progress has been made with the new building slip. The machine shop in connection therewith will be completed in the coming financial year. A plumbers' shop will shortly be commenced.

Dredging.—Good progress is being made with dredging in French Creek, at Malta. At Bermuda, the deeping of the new camber is well in hand.

Coaling Depôts.—The work at Chatham is completed; that at Haulbowline will be finished during the present financial year. Satisfactory progress is being made at the Falklands and Esquimalt.

Hospitals.—Progress is being made with works at home and abroad for providing improved and additional hospital accommodation. A contract has been made for the new General Hospital at Portland.

The principal new works for 1902–1903 are—

Chatham.—New receiving shed for stores. New gun mounting store. A slaughter-house, &c. *Sheerness.*—A new fitting shop. *Portsmouth.* — New steam factory. Extending No. 13 Dock. *Eastney.*—A new church for marines, &c.

New Torpedo Ranges.—At Chatham and Malta; and *New Rifle Range* at Malta and extension of present range at Sheerness.

Progress under Naval Works Loan Acts.

Enclosure and Defence of Harbours.

Gibraltar.—The "Admiralty Mole" extension is being increased to its full section. Of the quay wall on the harbour side of the mole a length of 2602 ft. is finished and coped.

The whole of the detached mole is now above low-water level, and all blockwork complete. The southern half of the superstructure of masonry and concrete is approaching completion.

The extension of the Commercial Mole up to the eastern end of the Viaduct is completed, and the embankment has been partially completed from the western end of the Viaduct up to the north wall of the Northern Arm.

Portland.—About 7300 super yards of facing to the breakwater have been executed, and a length of about 630 ft. is completed.

Dover.—Admiralty Pier Extension.—The foundation course is now laid for about 760 ft., the low-water course to 640 ft., and the course at formation level to 590 ft.

The temporary movable lighthouse is completed, and the light has been exhibited since December 10.

East Reclamation.—The wall is now completed to the level of 4 ft. above high water; 200 lin. ft. of the upper course of blocks still remain to be set, together with 940 ft. of coping. About 3275 ft. of the protecting apron are now laid.

East Arm and Root Wall.—The foundations are now laid for a total length of 760 ft., the low-water course for 675 ft., and the work is complete to formation level for a length of 615 ft.

Adapting Naval Ports, &c.

Deepening Harbours and Approaches.—At Portsmouth, the outer and inner bars and approach channel are practically completed. In the inner harbour more than half the number of berths required have been dredged. The approach to Fountain Lake has been completed as far east as the coaling point. Fountain Lake and the widening opposite M caisson has been completed to 25 ft. L.W.O.S.T.

At Devonport, work is now in progress above Saltash Bridge, where 13 berths have been dredged with depth of water at L.W.O.S.T. of 24 ft. Five others are almost complete.

Keyham Dockyard Extension.—Graving Dock No. 4.—Complete with the exception of the upper portion of the caisson camber. Graving Dock No. 5.—Floor practically completed. About half the length of the side walls are up to coping level. Graving Dock No. 6.—Concrete under the floor has been deposited. The side walls are in progress.

Entrance Lock.—West wall is practically completed, except at the north entrance. The north caisson camber is complete to 15 ft. below coping. At the south and north ends excavations for floor and east wall are partially completed.

Closed Basin.—About 300,000 cubic yards of mud have been excavated and removed to sea. East wall is completed. North wall is completed for a length of 850 ft. West wall for a length of 300 ft. on the north side of the entrance has been built to a level of 11 ft. below coping, and south of the entrance lengths of 120 ft. and 210 ft. have been brought up to 27 ft. and 11 ft. below coping respectively. The south wall has been commenced. The caisson camber has been built to a level of 16 ft. below coping.

Tidal Basin.—North wall is in progress.

Outer Wall.—The wall has been completed for a length of 500 ft., and for a further length of 350 ft. the wall has been built up to 3 ft. below coping.

Gibraltar Dockyard Extension.—The reclamation is making good progress. The Chief Constructor's and Chief Engineer's buildings are nearing completion. Some of the machine foundations are completed and machines fixed. The store buildings have been commenced. At the New Mole Parade a portion of the concrete for the east and west walls and round the head of No. 1 Dock has been put in. The excavation for No. 3 Dock is practically complete.

Partial concrete backing for east and west walls complete except at head of dock. Concreting of floor nearly complete, as is also the floor of the caisson camber.

The dam across to the New Mole for Docks Nos. 1 and 2 is complete. The enclosed area has been pumped dry and excavation therefrom is in progress.

A portion of the main entrance wall next New Mole is above water level.

The main wharf wall is making good progress, and the foundation is in for the 50-ton crane. The slipways for torpedo boat destroyers are in hand, of which four are complete and in use.

Hong Kong.—The constructing of the dock, reclaiming land, providing wharf walls and a basin, and erecting additional shops, are in progress.

Pembroke.—Jetty.—This work is progressing, but it will not be finished until next financial year.

Chatham.—Dock.—Good progress is being made with the contract.

Malta.—Dockyard Extension.—Good progress has been made on the site and the subsidiary works, and also on the two docks which are being built by contract.

Bermuda.—Dockyard Extension.—A contract for the extension was made in March, 1901, and the work is progressing. The work of dredging is being continued.

Simon's Bay Dockyard Extension.—The necessary preliminary works for the main contract are in hand.

Naval Barracks, &c.

Chatham Naval Barracks.—The whole of the works comprised under the principal contract for the main buildings, including the men's quarters and officers' mess, are completed. Under the second contract the work is being well advanced.

Portsmouth Naval Barracks.—The War Office have transferred the Anglesea Barracks, and have arranged for the transfer of further land required on the site of the Military Hospital. The officers' quarters are well advanced. Six of the men's blocks are roofed in and slated, as are also the subsidiary buildings, guard house, and canteen. The residence for the Captain of the Barracks has been completed and is now occupied.

Keyham Naval Barracks.—The officers' mess block and blocks of quarters are completed, with the exception of the terrace and some

minor items. The two blocks of men's quarters are completed, with the exception of the mess fittings, &c., which are well in hand. The parade ground is nearly completed. The sick quarters have been roofed in and the internal finishing is approaching completion.

Chatham Naval Hospital.—The pavilions are roofed in. The constructional steel work and the wood and concrete floors are also completed. All constructional work to the administrative block and kitchen is completed.

The brickwork to two infectious blocks is up to roof plate level. In two similar blocks the brickwork is 5 ft. above ground floor level. The work on other subsidiary buildings is well advanced. The sick berth attendants' quarters are nearly completed.

Dartmouth.—"Britannia" R.N. College.—Progress is being made with the main buildings. The sick quarters will be completed early in next financial year.

The formation of roads and laying out of the grounds is practically completed.

Magazines.—At Chatham the Chattenden Magazine has just been taken over for use. The work at Priddy's Hard is practically completed. At Bull Point, Devonport, a considerable portion of the work is completed, and the buildings, &c., are in use.

February 10, 1902. S.

APPENDIX.

TERMS OF REFERENCE TO NAVAL RESERVES COMMITTEE.

(1.) How far are the present systems in force for the provision of Reserves satisfactory or capable of extension, as to officers of all branches, seamen, stokers, marines, sick berth staff, and other ratings?

(2.) How far can a Naval Volunteer movement be utilised to contribute towards the manning requirements of the War Fleet?

(3.) Is it feasible to form some auxiliary branch of the Royal Marines which could be made available for service on shore or afloat in time of war?

(4.) To what extent and in what manner can Colonial Naval Reserves contribute towards the manning requirements of the War Fleet, bearing in mind that on the outbreak of war the men in reserve would be in the Colonies, and that, as at present arranged, the ships in reserve that they could help to man would, with some few exceptions, all be in home ports?

(5.) Are there any other methods besides those hitherto mentioned which can be recommended for the formation of Naval Reserves?

(6.) What training should be required from the Reserves of the different classes, under what conditions should it be given, what staff of instructors and equipment of material would it entail, and how should the cost be borne?

(7.) What should be the pay and allowances and conditions of service of the Reserves of the different classes?

(8.) How far is the number of Active Service ratings required to man the War Fleet at any given time affected by

(*a*) The total number of ships in commission in peace?

(*b*) The number of ships in commission in peace which would not, in the opinion of the Admiralty, be of serious value in time of war?

(9.) Generally, whether and how, consistently with efficiency, Naval Reserves can be more fully utilised to supplement the Active Service ratings in peace or in war?

(10.) What will be the cost of any recommendations made, and how will that cost compare with an alternative increase of Active Service ratings?

It will not be open to the Committee, without further instructions, to recommend any fundamental change in the continuous service system under which the Active Service ratings of the Navy are at present entered and trained; but they may make recommendations as to improvements in detail, and generally as to how far, consistently with efficiency, the Active Service ratings can be supplemented by Reserves. Moreover, if they arrive at the conclusion that the formation of an adequate Reserve is not compatible with the present system, they are requested to make a report to that effect.

Abstract of Navy

Votes.		Estimates, Gross Estimate.	Estimates, Appropriations in Aid.
	I.—Numbers.		
A.	Total Number of Officers, Seamen, Boys, Coast Guard, and Royal Marines	122,500	. . .
	II.—Effective Services.	£	£
1	Wages, &c., of Officers, Seamen and Boys, Coast Guard, and Royal Marines	6,079,545	117,545
2	Victualling and Clothing for the Navy	2,512,706	489,206
3	Medical Establishments and Services	269,410	22,910
4	Martial Law	17,892	192
5	Educational Services	133,623	31,323
6	Scientific Services	86,092	20,492
7	Royal Naval Reserves	287,077	177
8	Shipbuilding, Repairs, Maintenance, &c.:		
	Section I.—*Personnel*	2,674,415	12,915
	Section II.—*Matériel*	5,017,700	205,000
	Section III.—Contract Work	7,738,150	72,350
9	Naval Armaments	3,420,175	63,775
10	Works, Buildings, and Repairs at Home and Abroad	1,128,000	28,000
11	Miscellaneous Effective Services	381,663	13,663
12	Admiralty Office	303,300	9,000
	Total Effective Services . . . . £	30,049,148	1,036,548
	III.—Non-Effective Services.		
13	Half-Pay, Reserved, and Retired Pay	794,352	12,252
14	Naval and Marine Pensions, Gratuities, and Compassionate Allowances	1,182,682	21,982
15	Civil Pensions and Gratuities	350,535	435
	Total Non-Effective Services . . £	2,327,569	34,669
	Grand Total . . . . £	32,376,717	1,121,217

Note.—Under an Act of the Cape of Good Hope Legislature, entitled "The Navy Contribu-
contribution towards the annual expenditure by the Imperial Government in connection with
A gift of 12,000 tons of coal for the use of His Majesty's Ships, &c., is made annually by the
of coal.

Estimates for 1902–1903.

1902 1903.	Estimates, 1901–1902.			Difference on Net Estimates.		Votes.
Net Estimate.	Gross Estimate.	Appropriations in Aid.	Net Estimate.	Increase.	Decrease.	
Total Numbers.			Total Numbers.	Numbers.	Numbers.	
122,500	118,625	....	118,625	3,875	....	A.
£	£	£	£	£	£	
5,962,000	5,877,308	117,308	5,760,000	202,000	....	1
2,023,500	2,389,539	497,239	1,892,300	131,200	....	2
246,500	239,913	20,913	219,000	27,500	....	3
17,700	16,281	81	16,200	1,500	....	4
101,700	129,479	28,879	100,600	1,100	....	5
65,600	86,259	20,459	65,800	....	200	6
286,900	292,236	136	292,100	....	5,200	7
						8
2,661,500	2,696,815	12,815	2,684,000	....	22,500	Sec. I.
4,812,700	5,481,500	175,000	5,306,500	....	493,800	Sec. II.
7,665,800	6,757,920	72,420	6,685,500	980,300	....	Sec. III.
3,356,400	3,981,255	64,555	3,919,700	....	563,300	9
1,100,000	1,043,100	20,000	1,023,100	76,900	....	10
368,000	375,604	16,104	359,500	8,500	....	11
294,300	288,600	9,000	279,600	14,700	....	12
28,962,600	29,658,809	1,054,909	28,603,900	1,443,700	1,085,000	
782,100	803,154	12,254	790,900	....	8,800	13
1,160,700	1,162,009	21,909	1,140,100	20,600	....	14
350,100	341,001	101	340,600	9,500	....	15
2,292,900	2,306,164	34,564	2,271,600	30,100	8,800	
31,255,500	31,964,973	1,089,473	30,875,500	1,473,800	1,093,800	

Net Increase £380,000

tion Act, 1898," a sum of £30,000 is paid annually out of the public revenue of that Colony as a
His Majesty's Naval Service.
Natal Government. As a temporary arrangement, £1,000 a month is paid in lien of a supply

STATEMENT showing the Actual and Estimated EXPENDITURE for NAVAL SERVICES for the Three Years ending the 31st March, 1903.

		£	s.	d.
1900-1901.	Estimated Expenditure (after deducting Appropriations in Aid)	27,522,600	0	0
	Additional Estimate (13th July, 1900)	1,269,300	0	0
	Supplementary Estimate (26th February, 1901)	1,250,000	0	0
		30,041,900	0	0
	Net Expenditure, as per Final Account	29,998,529	4	7
	Expenditure less than Estimate	£43,370	15	5
1901-1902.	Estimated Expenditure (after deducting Appropriations in Aid)	£30,875,500	0	0
1902-1903.	Estimated Expenditure (after deducting Appropriations in Aid)	£31,255,500	0	0

STATEMENT of the Principal Points of DIFFERENCE between the ESTIMATES of 1901–1902 and those for 1902–1903.

INCREASES.		£
Wages, &c., of Officers, Seamen, and Marines		202,000
Victualling and Clothing		131,200
Medical Establishments and Services		27,500
Martial Law		1,500
Educational Services		1,100
Propelling and Auxiliary Machinery for His Majesty's Ships and Vessels (Contract)		963,770
Repairs and Alterations by Contract of Ships, &c.		60,000
Gun Mountings (Contract)		199,800
Royal Reserve of Merchant Cruisers		55,687
Wages of Artificers and Crews of Vessels (Naval Ordnance Establishments)		17,400
Torpedoes and Gun-cotton		1,800
Inspection, Proof, Experiments, and Freight (Naval Ordnance Stores)		20,000
Works, Buildings, and Repairs		76,900
Miscellaneous Effective Services		8,500
Non-Effective Services		21,300
Miscellaneous Items		41,543
		£1,830,000
DECREASES.	£	
Scientific Services	200	
Royal Naval Reserves	5,200	
Wages, &c., of Men in Dockyards	41,800	
Naval Stores	497,300	
Hulls of Ships (Contract)	163,330	
Purchase of Ships, Vessels, &c.	109,000	
Machinery for Shore Establishments (Contract)	26,670	
Guns	25,600	
Projectiles and Ammunition	463,100	
Small Arms and Miscellaneous Naval Ordnance Stores, &c.	117,800	
		1,450,000
Net Increase	£	380,000

STATEMENT showing the Total Estimated **EXPENDITURE** for the **NAVAL SERVICE**, including Amounts provided in the **NAVY ESTIMATES**, as well as in the **CIVIL SERVICE** and other **ESTIMATES**, for the following Services :—

———		1902–1903.	1901–1902.
NAVY ESTIMATES:		£	£
Estimated Expenditure (after deducting Appropriations in Aid) . . .		31,255,500	30,875,500
CIVIL SERVICE ESTIMATES:			
Estimated Expenditure under—			
Class I. Vote 8.—Public Buildings, Great Britain:	£		
Maintenance and Repairs, including New Works, Alterations, &c. .	5,250		
Rents, Insurance, Tithes, &c. . .	9,680		
Fuel, Light, Water, &c.	4,900		
Furniture	3,500	23,330	21,760
Class I. Vote 9.—Surveys of the United Kingdom		200	200
„ I. „ 12.—Rates on Government Property . . .		98,900	98,800
„ I. „ 13.—Public Works and Buildings, Ireland:			
Coast Guard, viz.:	£		
Purchase of Sites	135		
New Works and Alterations, including Naval Reserve Stations . .	13,470		
Maintenance and Supplies . .	6,527		
	£20,132		
Naval Reserve, viz.:			
Maintenance and Supplies . .	219	20,351	16,640
Class II. Vote 8.—Board of Trade:			
Staff and Incidental Expenses in connection with the Royal Naval Reserve Force		3,486	3,466
„ II. „ 9.—Mercantile Marine Services:			
Staff and Incidental Expenses in connection with the Royal Naval Reserve Force		2,450	2,450
„ II. „ 14.—Exchequer and Audit Department (Cost of Audit):	£		
Navy Cash Accounts	7,949		
Expense and Manufacturing Accounts	4,982		
Store Accounts	5,595	18,526	18,336
Class II. Vote 23.—Stationery and Printing		80,000	74,000
„ III. „ 1.—Law Charges, England		6,346	5,380
Maintenance of Naval Prisoners:			
„ III. „ 7.—Prisons, England and the Colonies . . .		6,550	5,980
„ III. „ 13.—Prisons, Scotland		120	105
„ III. „ 20.—Prisons, Ireland		256	100
REVENUE DEPARTMENT ESTIMATES:			
Vote 1.—Customs.—Percentage for provision of funds for District Paymasters of the Coast Guard		139	122
Vote 1.—Customs.—Staff and Incidental Expenses in connection with the Royal Naval Reserve Force		3,261	3,261
Vote 2.—Inland Revenue.—Analysis of Food, &c.		140	120
Vote 3.—Post Office.—Postage of Official Correspondence (including Parcels)	£ 16,616		
Vote 5.—Post Office Telegraphs.—Official Telegrams and Expenses in connection with Telegraphs (Admiralty Wires, and Services of Clerks)	18,184	38,340	33,767
Total	£	31,554,355	31,159,987

Note.—In addition to the Services shown above, an annuity of £16,243 18*s.* is payable to the Commissioners of Woods, &c., from the Consolidated Fund, under the Public Offices Sites Act of 1882 (45 & 46 Vict. c. 32).

VOTE (A).

NUMBERS of OFFICERS, SEAMEN, BOYS, and ROYAL MARINES Borne on the Books of His Majesty's Ships, and at the ROYAL MARINE DIVISIONS.

One Hundred and Twenty-two Thousand Five Hundred.

I.—SEA SERVICE.

Under which Vote Provided.	RANKS, &c.	NUMBERS, ALL RANKS. 1902–1903.		1901–1902.		Numbers of all Ranks borne on 1st January, 1902.
Vote 1	FOR HIS MAJESTY'S FLEET:					
	Flag Officers	16		15		
	Commissioned Officers . .	4,018		3,754		
	Subordinate Officers . . .	764		852		
	Warrant Officers . . .	1,641		1,501		
	Petty Officers and Seamen .	78,522		75,501		
	Boys (Service)	3,700		3,700		
			88,691		85,323	84,885
	COAST GUARD:					
	Commissioned Officers . .	88		89		
	Chief Officers of Stations .	239		238		
	Petty Officers and Seamen .	3,873		3,873		
			4,200		4,200	4,129
	ROYAL MARINES (for Service Afloat and on Shore):					
	Commissioned Officers . .	471		471		
	Warrant Officers . . .	32		33		
	Staff Sergeants and Sergeants .	1,417		1,417		
	Buglers and Musicians . .	647		647		
	Rank and File	17,022	(a)	17,022		
			19,589		19,590	19,396
	Total . . .		112,480		109,113	108,410
	Net Increase		3,367			

II.—OTHER SERVICES.

Under which Vote Provided.	RANKS, &c.	1902–1903.		1901–1902.		Numbers of all Ranks borne on 1st January, 1902.
Vote 1	Naval Cadets	305		260		
	Engineer Students	187		180		
	Pensioners in Home Ships and in the Reserves, &c. . . .	1,282		1,048		
	Boys under Training . . .	6,200	(b)	6,200		
			7,974		7,688	7,827
Other Votes	Various Services	..	2,046	..	1,824	1,799
	Total . . .		10,020 (c)		9,512	9,626
	Net Increase		508			
	Total, Sea Service . . .	112,480		109,113		
	„ other Services . . .	10,020		9,512		
			122,500		118,625	
	Net Increase		3,875			

(a) Including 12 officers and 27 men, Sub-Head II.
(b) Including 10 officers, Sub-Head II.
(c) Including:

	1902–1903.		1901–1902.
Officers and Seamen	1,730	..	1,621
„ Pensioners (Vote 1)	1,272	..	1,041
„ Pensioners (other Votes) . . .	16	..	15
„ Boys (Training, Seamen Class) . .	6,200	..	6,200
„ Boys (Training, Artizans) . . .	586	..	420
„ Royal Marines	216	..	215
	10,020	..	9,512

VOTE 8.

SHIPBUILDING, REPAIRS, MAINTENANCE, &c.

I.—ESTIMATE of the SUM which will be required, in the YEAR ending 31st March, 1903, to defray the EXPENSES of SHIPBUILDING, REPAIRS, MAINTENANCE, &c., including the COST of ESTABLISHMENTS of DOCKYARDS and NAVAL YARDS at HOME and ABROAD.

DOCKYARD WORK.

SECTION I.—PERSONNEL.—Two Million Six Hundred and Sixty-One Thousand Five Hundred Pounds.

(£2,661,500.)

SECTION II.—MATÉRIEL.—Four Million Eight Hundred and Twelve Thousand Seven Hundred Pounds.

(£4,812,700.)

CONTRACT WORK.

SECTION III.—CONTRACT WORK.—Seven Million Six Hundred and Sixty-five Thousand Eight Hundred Pounds.

(£7,665,800.)

I.—SUB-HEADS under which SECTION I., PERSONNEL, of this VOTE will be accounted for.

	ESTIMATES. 1902–1903.	ESTIMATES. 1901–1902.	Increase.	Decrease.
	£	£	£	£
DOCKYARD WORK.				
SECTION I.—PERSONNEL.				
Dockyards at Home.				
A.—Salaries and Allowances	(*a*) 192,609	185,751	6,858	..
B.—Wages, &c., of Men, and hire of Teams	2,037,765	2,096,520	..	58,755
C.—Wages, &c., of Police Force	44,028	43,786	242	..
D.—Contingencies	7,400	7,000	400	..
Naval Yards Abroad.				
E.—Salaries and Allowances	(*a*) 90,477	80,255	10,222	..
F.—Wages, &c., of Men, and hire of Teams	285,476	268,522	16,954	..
G.—Wages, &c., of Police Force	15,260	13,681	1,579	..
H.—Contingencies	1,400	1,300	100	..
£	2,674,415	2,696,815	36,355	58,755
Deduct,—				
I.—Appropriations in Aid	12,915	12,815	100	..
£	2,661,500	2,684,000	36,255	58,755
		Net Decrease	£22,500	

(*a*) These amounts include the sums of £28,767 and £9,024 for pay of Inspectors of Trades at Home and Abroad respectively, which is charged direct to the cost of shipbuilding.

Note.—Provision has been made for New Construction in the above Vote to the extent of—

	£
Section 1	993,100
,, 2	1,144,000
,, 3	6,921,420
	£9,058,520

Vote 8.—Shipbuilding, Repairs, Maintenance, &c.—*continued.*

II.—Sub-Heads under which Section II., Matériel, of this Vote will be accounted for.

——	Estimates. 1902-1903.	1901-1902.	Increase.	Decrease.
	£	£	£	£
DOCKYARD WORK—*continued.*				
Section II.—Matériel.				
Naval Stores, &c.				
A.—Timber, Masts, Deals, &c.	140,000	145,000	..	5,000
B.—Metals and Metal Articles	1,799,700	2,426,000	..	626,300
C.—Coals for Yard purposes	105,000	126,000	..	21,000
D.—Hemp, Canvas, &c.	261,000	225,000	36,000	..
E.—Paint Materials, Oils, Pitch, Tar, Tallow, Boats, Furniture, and other Miscellaneous Articles	646,500	584,500	62,000	..
F.—Electrical, Torpedo, and other Apparatus	315,000	235,000	80,000	..
G.—Freight	75,000	69,000	6,000	..
H.—Rents, Water, &c., Dockyards at Home, and Naval Yards Abroad	37,340	35,785	1,555	..
I.—Gas, &c., Dockyards at Home, and Naval Yards Abroad	17,160	15,215	1,945	..
Coals for the Fleet.				
K.—Coals, &c., for the Fleet	1,621,000	1,620,000	1,000	..
£	5,017,700	5,481,500	188,500	652,300
Deduct,—				
L.—Appropriations in Aid	205,000	175,000	30,000	..
£	4,812,700	5,306,500	158,500	652,300
		Net Decrease	£493,800	

VOTE 8.—SHIPBUILDING, REPAIRS, MAINTENANCE, &c.—*continued.*

II.—SUB-HEADS under which SECTION III., CONTRACT WORK, of this VOTE will be accounted for.

———	ESTIMATES. 1902-1903.	ESTIMATES. 1901-1902.	Increase.	Decrease.
	£	£	£	£
SECTION III.—CONTRACT WORK.				
A.—Propelling Machinery for His Majesty's Ships and Vessels	3,287,330	2,367,236	920,094	..
B.—Auxiliary Machinery for His Majesty's Ships and Vessels	133,244	89,568	43,676	..
C.—Hulls of Ships, &c., Building by Contract	3,023,900	3,187,230	..	163,330
D.—Purchase of Ships, Vessels, &c.	..	109,000	..	109,000
E.—Repairs and Alterations by Contract of Ships, &c., and their Machinery and Stores	175,521	115,523	59,998	..
F.—Inspection of Contract Work	56,000	56,000	..	..
G.—Gun Mountings and Air-Compressing Machinery	810,848	611,050	199,798	..
H.—Machinery for His Majesty's Shore Establishments at Home and Abroad	188,307	215,000	..	26,693
I.—Royal Reserve of Merchant Cruisers	63,000	7,313	55,687	..
£	7,738,150	6,757,920	1,279,253	299,023
Deduct,—				
K.—Appropriations in Aid	72,350	72,420	..	70
£	7,665,800	6,685,500	1,279,253	298,953
	Net Increase		£980,300	

PROGRAMME of the ESTIMATED EXPENDITURE in CASH, and in NET REPAIRS, MAINTENANCE, &c., (Exclusive of the FLEET

SUB-HEADS under which this ESTIMATED EXPENDITURE will be provisions of Section 1 (2), ARMY

	ESTIMATED EXPENDITURE IN				
	Direct Expenditure.				
	Dockyard Work.		Contract Work, Sec. III.	Total Direct Expenditure. (A)	
	Personnel, Sec. I.	Matériel, Sec. II.			
	£	£	£	£	
NEW CONSTRUCTION:					
A.—DOCKYARD-BUILT SHIPS—					
Hulls, &c. (*c*)	736,955	(*f*) 993,282	321,407	2,051,644	1
Machinery	39,080	27,700	988,015	1,054,795	2
	776,035	**1,020,982**	**1,309,422**	**3,106,439**	3
B.—CONTRACT-BUILT SHIPS—					
Hulls, &c. (*c*)	213,365	119,918	(*g*) 3,392,054	3,725,337	4
Machinery	..	..	2,147,122	2,147,122	5
	213,365	**119,918**	**5,539,176**	**5,872,459**	6
C.—SMALL VESSELS (*d*) . . .	3,700	3,100	72,822	79,622	7
TOTAL NEW CONSTRUCTION	**993,100**	**1,144,000**	**6,921,420**	(*e*) **9,058,520**	8
D.—RE-CONSTRUCTION, REPAIRS, ALTERATIONS, &c.	857,932	(*h*) 657,183	459,350	1,974,465	9
E.—SEA STORES, &c.	..	968,500	10,256	978,756	10
F.—ESTABLISHMENT, INCIDENTAL, AND MISCELLANEOUS CHARGES, UNAPPROPRIATED .	..	..	..	..	11
TOTAL . . . £	**1,851,032**	**2,769,683**	**7,391,026**	**12,011,741**	12

(*c*) Including Hydraulic and Transferable Gun Mountings, &c.
(*d*) Including Harbour Craft, and excluding Torpedo Boats, &c., the value of which is included under other Sub-Heads.
(*e*) Exclusive of £40,000 provided under Vote 2 for new Tank Vessels for Victualling Yard Service; also £30,145 provided under Vote 9 for new Vessels for Naval Ordnance Store Service, and £90,000 for Coaling Craft, Vote 8, Section 2, Sub-Head K.
(*f*) Including £519,027 for Armour. (*g*) Including £812,313 for Armour. (*h*) Including £149,183 for Armour.

VALUES OF STORES issued for SHIPBUILDING, RE-CONSTRUCTION,
in the Year 1902–1903.
COALING SERVICE.)
accounted for in the NAVY EXPENSE ACCOUNTS, under the
AND NAVY AUDIT ACT, 1889.

	1902-1903.		EXPENDITURE AS ESTIMATED IN NAVY ESTIMATES, 1901-1902.			Difference between Direct Expenditure, 1901–1902 (B) and 1902–1903 (A).	
	Establishment, &c., Charges, apportioned.	Aggregate, 1902-1903.	Direct Expenditure. (B)	Establishment, &c., Charges, apportioned.	Aggregate, 1901–1902.	Increase.	Decrease.
	£	£	£	£	£	£	£
1	227,484	2,279,128	(i) 2,876,640	300,289	3,176,929	..	824,996
2	28,347	1,083,142	915,861	25,856	941,717	138,934	..
3	**255,831**	**3,362,270**	**3,792,501**	**326,145**	**4,118,646**	..	**686,032**
4	124,874	3,850,211	(k) 3,725,666	92,916	3,818,582	..	329
5	32,207	2,179,329	1,383,130	22,113	1,405,243	763,992	..
6	**157,081**	**6,029,540**	**5,108,796**	**115,029**	**5,223,825**	**763,663**	..
7	1,697	81,319	101,959	1,741	103,700	..	22,337
8	**414,600**	**9,473,129**	**9,003,256**	**442,915**	**9,446,171**	**55,264**	..
9	221,063	2,195,528	1,709,908	203,588	1,913,496	264,557	..
10	75,458	1,051,214	825,391	42,912	868,303	153,365	..
	711,130						
11	1,501,741	1,501,741	..	1,574,194	1,574,194	..	..
12	**2,212,871**	**14,224,612**	**11,538,555**	**2,263,609**	**13,802,164**	..	..

NET INCREASE ON DIRECT EXPENDITURE . . £473,186

(i) Including £1,224,000 for Armour.
(k) Including £1,018,000 for Armour.

RECAPITULATION OF ESTIMATED EXPENDITURE.

DESCRIPTION OF EXPENDITURE.	DOCKYARD WORK.				CONTRACT WORK.	OTHER ESTABLISHMENT AND INCIDENTAL CHARGES.		TOTAL.
	LABOUR.		MATERIALS (NET).					
	Dockyards at Home.	Dockyards Abroad, &c.	Dockyards at Home.	Dockyards Abroad, &c.		Dockyards at Home.	Dockyards Abroad, &c.	
	£	£	£	£	£	£	£	£
Direct Expenditure, including "Manufactures"	1,765,532	203,500	(b) 2,300,950	(b) 468,733	7,391,026	..	..	12,129,741
Establishment and Incidental Charges .	301,000	91,000	264,200	87,300	307,307	784,914	377,150	2,212,871
TOTAL . . . . £	(a) **2,066,532**	(a) **294,500**	**2,565,150**	**556,033**	**7,698,333**	**784,914**	**377,150**	**14,342,612**

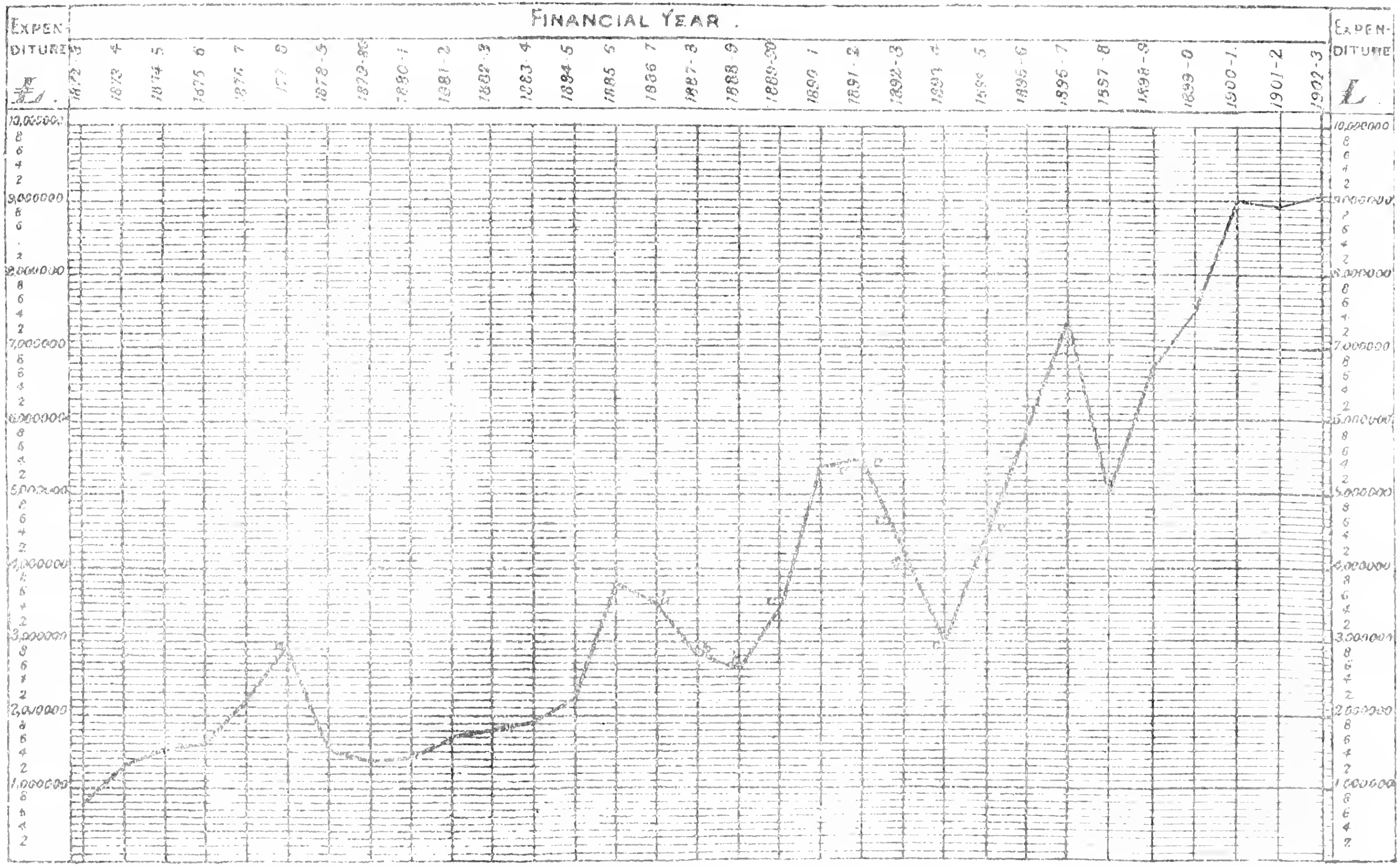
Deduct,—Value of Labour to be expended upon the Manufacture of Stores, included in the values of materials to be issued . . . 118,000

TOTAL ESTIMATED EXPENDITURE . . . . £ **14,224,612**

	Dockyards at Home.	Dockyards Abroad.
	£	£
(a) TOTAL VOTE 8, Section 1, Sub-heads B and F	2,037,765	285,476
Add,—Salaries of Inspectors of Trades	28,767	9,024
TOTAL	£2,066,532	294,500

(b) Exclusive of an estimated expenditure of £79,000 on dockyards at home and £14,100 on dockyards abroad for supplies to other departments, etc., on repayment.

DIAGRAM SHEWING THE ACTUAL EXPENDITURE UPON THE CONSTRUCTION OF NEW SHIPS DURING THE 31 YEARS BETWEEN 1872-73 & 1902-3.



Hanhart lith.

(a) Includes £ 1,523,000 for purchase of Ships under the Vote of Credit
(b) Includes Expenditure under Lord Northbrook's Special Programme
(c) Includes Expenditure under the Defence Acts of 1888 and 1889.

LIST of NEW SHIPS and VESSELS Estimated to be Passed into the FLEET RESERVE during the Years 1902–1903 and 1901–1902.

1902–1903.

Name of Ship.	Load Displacement in Tons.	Indicated Horse Power.	Number of Guns.
ARMOURED SHIPS.			
London	15,000	15,000	16
Venerable	15,000	15,000	16
Duncan	14,000	18,000	16
Cornwallis . . .	14,000	18,000	16
Russell	14,000	18,000	16
Drake	14,100	30,000	18
King Alfred . . .	14,100	30,000	18
Leviathan . . .	14,100	30,000	18
Good Hope . . .	14,100	30,000	18
Bacchante . . .	12,000	21,000	14
Hogue	12,000	21,000	14
Kent	9,800	22,000	14
Bedford	9,800	22,000	14
PROTECTED SHIPS.			
Nil.			
UNPROTECTED SHIPS.			
Assistance . . .	9,600	*4,200 (Howden's)	..
Aquarius	..	1,100	..
Odin	1,070	1,400	6
Merlin	1,070	1,400	6
Torpedo Boat Destroyers Nil.	..	..	..
Torpedo Boats ,,	..	..	..
Submarine Boats ,,	..	..	..

1901–1902.

Name of Ship.	Load Displacement in Tons.	Indicated Horse Power.	Number of Guns.
ARMOURED SHIPS.			
Formidable . . .	15,000	15,000	16
Implacable . . .	15,000	15,000	16
Irresistible . . .	15,000	15,000	16
Bulwark	15,000	15,000	16
Albion	12,950	13,500	16
Vengeance . . .	12,950	13,500	16
Aboukir	12,000	21,000	14
Cressy	12,000	21,000	14
Sutlej	12,000	21,000	14
PROTECTED SHIPS.			
Spartiate . . .	11,000	18,000	16
Pandora	2,200	*7,000	8
UNPROTECTED SHIPS.			
Victoria and Albert	4,700	11,000	..
Espiègle	1,070	1,400	6
Fantôme	1,070	1,400	6
Mutine	980	1,400	6
Rinaldo	980	1,400	6
Teal	180	800	2
Moorhen	180	800	2
Torpedo Boat Destroyers 22 No.	various		
Torpedo Boats 4 No.	..	..	..
Submarine Boats . 5 No.	..	..	..

* Forced draught.

French Navy Estimates, 1902.

Cap. in French Estimates.	Heads of Expenditure.	Credits voted for 1902.	Credits voted for 1901.
		£	£
	PERSONNEL.		
1, 2	Admiralty Office	139,795	139,380
3, 4, 5	Navy Pay	1,952,982	1,951,348
6	Marines*	61,836	645,922
7	Gendarmerie Maritime	27,804	30,792
8	Inspection of Administrative Services	11,413	10,389
9	Construction Staff	226,017	231,336
10, 11, 12	Administrative Staff, Commissariat, &c.	265,753	273,440
13	Medical and Religious Staff	75,985	86,592
14	Fisheries and Navigation	28,052	28,052
	LABOUR.		
	Wages—		
15	Shipbuilding; new construction; fitting for sea	476,127	469,646
16	Shipbuilding; repairs	201,960	214,620
17	Master-attendants' and Storekeepers' Departments	246,933	258,545
18	Armaments; construction of new guns	127,236	125,354
19	Armaments; repairs	68,100	67,600
20	Works	26,691	27,131
20 bis	Submarine defences	25,203	—
21	Victualling	34,389	33,969
22	Hospitals and Miscellaneous	14,387	14,207
	MATÉRIEL.		
	Stores and Supplies—		
23	Admiralty	9,990	10,136
24	Shipbuilding in Dockyards	1,561,345	1,539,824
25, 26	Shipbuilding by contract	1,525,959	1,397,181
27, 28	Fitting for sea; maintenance; repairs	768,987	746,994
	Carried forward	£7,876,944	£8,302,458

* Transferred to War Department.

Cap. in French Estimates.	Heads of Expenditure.	Credits voted for 1902.	Credits voted for 1901.
		£	£
	Brought forward - -	7,876,944	8,302,458
	MATÉRIEL—*continued.*		
	Stores and Supplies—*continued.*		
29, 30	Repairs, conversions, &c., in dockyards and by contract	651,842	592,202
31, 32	Armaments; new guns and conversions; Powder, ammunition, repairs, tools, &c.	1,052,040	1,109,240
33, 34	Torpedoes	178,056	178,056
35	Works; new and large alterations. .	144,069	589,711
36	Ditto; deepening of the Charente .	10,000	19,966
37, 38	Ditto, supplementary for defence of military ports	439,854	35,950
39, 40	Works; repairs	63,724	70,045
41	Hydrographic Service	20,864	20,944
42	Clothing*	151,848	220,140
43	Barracks	5,149	30.625
44, 45	Victualling*	831,852	1,015,536
46	Hospitals, &c.	79,304	107,959
47, 48	Fuel, lighting, office furniture, printing, &c.	43,212	55,145
	MISCELLANEOUS.		
49, 50	Travelling expenses, freight, allowance for lodgings, &c.	198,222	234,200
51	Charitable and subscriptions . . .	39,199	41,232
52	Fisheries and Commerce (materials for protection, &c.)	14,860	13,460
53	Pensions	466,908	466,828
54	Secret Service	4,000	4,000
	Total . . .	£12,271,947	£13,107,697

* Marines transferred to War Department.

Programme of New Construction, to be continued or undertaken in 1902.—Building in Dockyards.

Class.	Names of Ships.	Where Building.	Date of Commencement.	Proposed Date of Completion.	Estimated Cost.	Probable Expenditure in 1902.
					£	£
Battleships	République (ex A. 8)	Brest	..	1903	1,409,442	185,110
	A. 12	,,	..	1906	1,409,442	—
	Henri IV.	Cherbourg	1897	1901	801,247	12,380
	Suffren	Brest	1899	1901	1,195,563	62,040
Armoured Cruisers, First-class	Jules Ferry	Cherbourg	1900	1903	1,198,372	221,331
	Léon Gambetta	Brest	1900	1903	1,198,372	494,125
	Victor Hugo	Toulon	1901	1905	1,198,372	262,441
	C. 14	Lorient	1902	1905	1,198,372	107,899
	Dupetit-Thouars	Toulon	1899	1902	819,367	85,652
	Gueydon	Lorient	1898	1902	832,288	75,855
	Condé	,,	1898	1904	914,203	182,264
	Gloire	,,	1899	1903	902,461	161,474
	La Marseillaise	Brest	1900	1902	860,920	217,660
	Dupleix	Rochefort	1899	1903	751,907	86,477
	Jurien de la Gravière	Lorient	1897	1902	453,498	6,440
Torpedo-gunboats and Destroyers	Carabine	Rochefort	..	1903	59,980	20,706
	Sarbacane	,,	..	1903	59,980	20,706
	Francisque (ex M. 22)	,,	..	1904	59,980	26,384
	Sabre (ex M. 23)	,,	..	1904	59,980	21,584
	M. 32	,,	..	1905	59,980	11,020
	M. 33	,,	..	1905	59,980	11,020
	Pertuisane	,,	1900	1902	59,402	5,192
	Escopette	,,	1900	1902	59,402	5,145
	Flamberge	,,	1901	1902	59,402	29,202
	Rapière	,,	1901	1903	59,402	19,811
Submarines	Silure	Cherbourg	..	1902	26,256	3,084
	Espadon	,,	..	1902	26,256	3,484
	Naïade (Q. 15)	,,	..	1902	14,616	12,216
		Carried forward		.. .. £	15,808,442	2,350,702

PROGRAMME OF NEW CONSTRUCTION, TO BE CONTINUED OR UNDERTAKEN IN 1902.—BUILDING IN DOCKYARDS—*continued*.

Class.	Names of Ships.	Where Building.	Date of Commencement.	Proposed Date of Completion.	Estimated Cost.	Probable Expenditure in 1902.
					£	£
			Brought	forward .	15,808,442	2,350,702
Submarines continued .	Protée (Q. 16) .	Cherbourg	..	1902	14,616	12,216
	Perle (Q. 17). .	Toulon .	..	1902	14,616	8,412
	Esturgeon (Q. 18)	,, .	..	1903	14,616	7,812
	Bonite (Q. 19) .	,, .	..	1903	14,616	7,812
	Thon (Q. 20) . .	,, .	..	1903	14,616	7,812
	Souffleur (Q. 21).	,, .	..	1903	14,616	8,012
	Dorade (Q. 22) .	,, .	..	1903	14,616	8,012
	Lynx (Q. 23). .	Cherbourg	..	1903	14,616	5,796
	Ludion (Q. 24) .	,,	..	1903	14,616	5,676
	Loutre (Q. 25) .	Rochefort	..	1903	14,616	8,716
	Castor (Q. 26) .	,,	..	1903	14,616	8,716
	Phoque (Q. 27) .	,,	..	1904	14,616	4,560
	Otarie (Q. 28) .	,,	..	1904	14,616	4,560
	Méduse (Q. 29) .	,,	..	1904	14,616	4,520
	Oursin (Q. 30) .	,,	..	1904	14,616	4,520
	Grondin (Q. 31) .	Toulon .	..	1903	14,616	4,776
	Anguille (Q. 32).	,, .	..	1903	14,616	4,776
	Alose (Q. 33). .	,, .	..	1903	14,616	4,776
	Truite (Q. 34) .	,, .	..	1903	14,616	4,776
	Q. 35 to Q. 42 and Q. 61 to Q. 68 (16 boats)	Various .	..	1902–4	451,004	57,431
	Sirène	Cherbourg	1900	1902	26,256	1,800
	Triton	,,	1900	1902	26,256	1,800
	Lutin	Rochefort	..	1902	31,080	5,250
First-class Torpedo-boats	277 (ex P. 96) .	Saigon .	..	1903	20,425	9,321
	P. 112 . . .	,,	..	1904	20,425	3,622
	224 (ex P. 32) .	Cherbourg	..	1902	19,261	1,280
	244 (ex P. 63) .	Saigon .	..	1902	20,425	3,300
	Total building in Dockyards, 1902			..	£ 16,697,278	2,560,762

Programme of New Construction, to be continued or undertaken in 1902.—Building by Contract.

Class	Names of Ships.	Places of Building and Completion.	Date of Contract.	Date of Completion	Total Estimated Cost.	Expenditure proposed for 1901.
					£	£
Battleships	Patrie (ex A. 10)	..	1901	1905	1,447,842	369,456
	A. 11	..	1902	,,	1,447,842	106,000
	A. 13	..	,,	1906	1,447,842	—
	A. 14	..	,,	,,	1,447,842	—
First-class Armoured Cruisers	C. 15	..	,,	1905	1,204,128	96,361
	Montcalm	La Seyne—Toulon	1897	1902	902,809	116,890
	Sully	,, ,,	1899	1903	977,363	200,069
	Amiral Aube	St. Nazaire-Cherbourg	,,	,,	999,427	233,922
	Desaix	,, ,,	1900	,,	762,759	103,743
	Kléber	Bordeaux—Cherbourg	,,	..	770,321	87,647
Destroyers	Arquebuse	Le Havre—Cherbourg	,,	,,	73,686	21,018
	Arbalète	,, ,,	,,	,,	73,681	13,018
	Mousquet	Nantes—Lorient	,,	,,	68,881	19,714
	Javeline	,, ,,	,,	..	68,881	19,706
	Sagaïe	Le Havre—Cherbourg	,,	,,	69,401	30,018
	Epieu	,, ,,	,,	,,	69,401	21,162
	Harpon	Bordeaux—Rochefort	,,	,,	70,481	24,430
	Fronde	,, ..	,,	,,	70,481	20,426
	Dard (ex M. 24)	Rouen—Cherbourg	1901	1904	69,301	21,018
	Baliste (ex M. 25)	,, ..	,,	,,	69,301	21,018
	Mousqueton (ex M. 26)	Chalon—Toulon	,,	,,	69,301	21,018
	Arc (ex M. 27)	,, ,,	,,	1903	69,301	19,818
	Pistolet (ex M. 28)	Nantes—Lorient	,,	,,	69,301	19,818
	Bélier (ex M. 29)	,, ,,	,,	1904	69,301	19,818
	Catapulte (ex M. 30)	Le Havre—Cherbourg	,,	1903	69,301	13,218
	Bombarde (ex M. 31)	,, ..	,,	1904	69,301	13,218
Sea-going Torpedo Boats	Bourrasque	,, ,,	1899	1902	40,317	3,600
	Rafale	,, ,,	,,	,,	40,317	8,520
	Tramontane	Bordeaux—Rochfort	,,	1901	39,636	3,600
First-class Torpedo Boats	256 to 276 (ex P. 75 to P. 95 21 boats)	Various	1900–1	1902–3	407,549	191,095
	P. 97–111 (15 boats.)	,,	1902	1902–4	293,174	47,800
	Total building by contract, 1902				£13,348,469	1,887,139

German Navy Estimates, 1902.

(Converted at £1 = 20·43 marks.)

Ordinary Permanent Estimates.

——	Proposed for the financial year 1902.	Granted for the financial year 1901.
	£	£
Imperial Naval Office	80,481	72,590
Observatories	16,735	15,614
Accounts	19,512	17,553
Martial Law	4735	5266
Divine Service and Schools	4918	4121
Military *Personnel*	953,948	878,132
Maintenance of the Fleet	1,075,305	935,558
Victualling	69,676	57,450
Clothing	17,346	15,653
Barrack Administration, Cashiers and Accountants	57,507	121,920
Lodging Allowance	146,490	66,525
Medical	69,984	65,416
Travelling Expenses, Freight Charges, &c.	127,273	121,644
Training Establishments	15,880	15,486
Dockyard Expenses	1,116,160	1,058,343
Ordnance and Fortification	366,212	355,776
Accountant-General's Department	28,704	27,086
Pilotage and Surveying Services	26,628	25,691
Miscellaneous Expenses	54,068	48,561
Administration of Kiau-chau Protectorate	2648	2355
Total of Ordinary Permanent Estimates carried to next page £	4,254,210	3,910,740

Special Ordinary Estimates.

Shipbuilding Programme for the Financial Year 1902.

For the Construction of—

	£
Battleship Wittelsbach (C). 4th and final instalment . .	118,012
„ Wettin (D), „ . .	177,435
„ Zähringen (E), „ . .	177,435
„ Mecklenburg (F) 3rd instalment . .	108,909
„ Schwaben (G), „ . .	108,909
Large cruiser Prinz Adalbert (B), 3rd and final instalment .	279,002
Battleship H, 2nd instalment	276,553
„ J, „	276,553
Large cruiser Ersatz König Wilhelm, 2nd instalment . .	245,227
Small cruiser G,* 2nd instalment	112,580
„ H, „	112,580
„ J, „	112,580
Alteration of vessels of Siegfried class, 2nd instalment . .	288,790
Battleship K, 1st instalment	161,527
„ L, „	161,527
Large cruiser Ersatz Kaiser, 1st instalment	186,001
Small cruiser K, 1st instalment	61,674
„ L, „	61,674
„ Ersatz Zieten, 1st instalment	61,674
Gunboat B, 1st instalment	39,158
One Torpedo-boat Division, 2nd and final instalment . . .	168,382
One „ „ 1st instalment	166,422
Other items	216,593
Total	£3,679,197

Summary.

—	Proposed for the financial year 1902.	Granted for the financial year 1901.
	£	£
Ordinary Permanent Estimates	4,254,210	3,910,740
Shipbuilding	3,679,197	3,670,240
Armaments and Torpedo Equipments. . .	1,479.979	1,253,206
Other items	360,575	306,068
Extraordinary Expenditure	460,107	489,476
Total	£10,234,068	9,629,670

* Now named the Frauenlob.

Italian Navy Estimates, 1902-1903.

FINANCIAL YEAR 1ST JULY, 1902, TO 30TH JUNE, 1903.

Converted at £1 = 27 lire.

———	Proposed for 1902–1903.	Revised Estimates, 1901–1902.
ORDINARY EXPENDITURE—GENERAL EXPENSES.	£	£
Admiralty	51,621	51,624
Pensions	207,111	200,926
Expenditure on various services connected with the Mercantile Marine	353,553	427,431
Total £	612,285	679,981
EXPENDITURE FOR NAVAL SERVICES.	£	£
Ships fitting out, &c.	221,815	225,148
General Staff of the Navy	130,370	126,222
Corps of Constructors	49,928	49,630
Commissariat Service	30,704	30,519
Medical Service	25,260	21,867
Wages—Men	459,260	462,963
Gratuities	72,296	62,619
Assistants to Constructors and others	54,940	53,681
Accountants, &c.	53,852	53,519
Police	11,326	11,326
Telegraph Service	9037	9260
,, Materials	6555	5926
Forts—*Personnel*	12,964	12,037
Victualling	300,000	300,000
Lighting	7704	7704
Hospital Services	20,296	17,828
Honorary Distinctions	555	444
Fuel and Stores, for Ships in Commission	255,555	266,667
Salaries and Wages—Workshops and Fortifications	4130	4130
Training Establishments	13,037	15,111
Naval Academy	3625	5536
Scientific Services—*Personnel*	1374	1374
,, ,, *Matériel*	9444	9444
Law Charges	1185	1185
Travelling Expenses	22,222	18,519
Transport of Materials	4629	4629
Carried forward	£ 1,785,063	1,780,288

—	Proposed for 1902–1903.	Revised Estimates, 1901–1902.
	£	£
Brought forward	1,785,063	1,780,288
Materials for repair of existing Ships	207,925	205,926
Labour for maintenance of Hulls and Machinery	211,705	208,889
Materials for maintenance of Ships and Armaments	151,852	151,852
Guns, Torpedoes and Small Arms	81,481	81,481
Labour for construction and repair of Armaments	82,334	82,334
Works Department—Repairs	92,592	87,170
Construction and Completion of the following:— First-class Battleships: Benedetto Brin, at Naples; Regina Margherita, at Spezia; Vittorio Emanuele, at Castellamare; Regina Elena, at Spezia. Armoured Cruiser: Francesco Ferrucio, at Venice. Submarine Boat. Sundry Small Craft. *Laying down* three First-class Battleships of the Vittorio Emanuele class (A, B and C)	829,630	844,444
Fuel and Stores, Machines, Tools, and Plant for maintenance of Ships: Materials and Labour	161,111	161,111
Total	£3,603,694	3,603,495

Extraordinary Expenditure.

	£	£
General Expenses and Half Pay	3662	3650
Expenditure on New Construction	250,728	
Coast Defence and Fortifications	7407	14,814
Torpedoes	3703	18,518
Total	£ 265,500	36,982

Summary.

	£	£
Ordinary Expenditure—General Expenses	612,285	679,981
Expenditure for Naval Services	3,603,694	3,603,495
Extraordinary Expenditure	265,500	36,982
Depreciation of Ships in Commission	129,629	129,629
Rent of Lands occupied by Government	98,740	98,671
Grand Total	£4,709,848	4,518,758

Russian Navy Estimates, 1902.

(*Converted at* £1 = 9·6 *Roubles*)

Heads of Expenditure.	1902.	1901.
	£	£
Central and Ports Administration	250,060	244,690
Salaries and Assistance	57,862	56,800
Educational	117,566	118,000
Medical Establishment and Services	126,570	125,393
Pay of Officers, Seamen, &c.	603,036	561,723
Victualling	203,398	196,955
Clothing	303,758	300,195
Expenses of Ships in Commission	2,127,604	2,116,542
Hydrographic Department	94,950	104,959
Building and Maintenance of Lighthouses*	31,250	31,250
Survey of Mouths of Yenesei and Obi	5,698	5,698
Naval Armaments and Electric Lighting	1,194,620	1,246,365
New Construction, Repairs and Refits	2,670,574	2,666,991
Admiralty Yards and Workshops	597,971	606,528
Buildings, Rent and Repairs	589,583	589,000
Allowance for transport, &c.†	88,437	—
Various Expenses	186,215	258,087
Works of Port Alexander III.	419,452	333,333
Improvement of Vladivostock	208,333	208,333
Improvement and Fortification of Port Arthur	333,333	312,500
Expenditure on account of Next Year's Estimates	31,291	31,006
Total £	10,241,561	10,114,348

* The figure for lighthouses is not shown separately in the published particulars of Russian Navy Estimates for 1902. The same figure as for 1901 is given above and the amounts deducted from the estimate published for buildings.—Ed.

† Probably included in various expenses in 1901 Estimates.

United States Navy Estimates, 1902 and 1903.

(Converted at £1 = $4·8665, Par, as adopted by Congress).

Detailed objects of Expenditure and Appropriation.	Estimates, 1902.	Appropriations, 1902.	Estimates, 1903.
	£	£	£
Pay of the Navy	3,108,122	3,123,453	3,390,159
Pay, Miscellaneous . . .	123,292	123,292	123,292
Contingent, Navy . . .	2,055	2,055	2,055
Emergency Fund . . .	102,743	51,372	61,646
Bureau of Navigation . .	144,194	143,147	274,586
" Ordnance . . .	534,563	530,865	707,841
" Equipment. . .	917,456	824,990	959,211
" Yards and Docks .	135,994	134,569	161,143
Public Works—			
Bureau of Yards and Docks .	2,528,005	1,392,166	4,270,291
" Navigation, including Naval Academy, Training Stations, and War College . . .	640,382	628,412	383,341
" Ordnance . . .	175,978	65,365	299,455
" Equipment, including Depôts for Coal .	..	154,115	131,511
" Defences for insular naval stations and coal depôts	..	..	102,743
" Naval Observatory .	5,754	2,055	5,712
" Hydrographic Office .	..	..	47,262
Bureau of Medicine and Surgery.	42,124	43,152	50,345
" Supplies and Accounts	921,370	728,213	897,481
" Construction and Repairs	1,658,445	1,512,553	2,039,622
" Steam Engineering .	775,280	711,579	881,332
Naval Academy . . .	45,119	46,670	50,078
Marine Corps	599,717	575,058	615,117
Increase of Navy . . .	5,378,180	5,219,357	4,870,648
Total . . .	£17,838,773	£16,012,438	£20,324,871

I.

NAVAL STRENGTH.

To the Editor of "The Times."

SIR,—The Parliamentary recess affords an opportunity for the examination of important subjects outside the region of party politics. It is the object of the present communication to bring together, from the last issue of the *Naval Annual*, the leading facts as to the state of the Navy. Our position has been much discussed of late, and in certain quarters with groundless alarm.

And first as to the resources for manning the Fleet. The Navy Estimates for 1901-1902 make provision for a total force of 118,625 men. Accepting the figures given in a paper recently published in the *Nineteenth Century* by Mr. Robertson, M.P., late Civil Lord of the Admiralty, we may take the permanent force of France at under 50,000 and that of Russia at under 30,000 men.* We are far above the recognised two-Power standard in numbers, and the quality is undoubted.

Invidious criticisms from a foreign source have recently been put into circulation in the Press. In manœuvres, more especially under peace conditions, between fleets not equally matched in the types of ships of which they are composed, the issue depends as much or more on happier fortune than superior merit. It is certainly unfair to argue that the beaten side is inefficient. Is it not more fitting to congratulate the Service on the boldness with which grave risks have been taken, out of which the squadrons have come uninjured? To the Admiralty recognition is due for giving to the Navy the more thorough instruction to be obtained in mimic encounters between opposing fleets rather than by combining the whole force to win victories over an imaginary enemy. In this connection it is hardly a breach of confidence to say that I have heard in Lagos Bay, with a satisfaction which the country will share, expressions of the highest admiration from the Commander-in-Chief of the masterly skill with which great fleets have been handled by the Admirals, and the ships by captains, commanders, and lieutenants.

Looking behind the permanent force to our Reserve, the position is less satisfactory than we could wish. We need a greater power of expansion. Unless some action is taken by the Government the

* The figures were subsequently given officially in the House of Commons, those for Russia being considerably increased.—ED.

mercantile marine will cease to be a reliable resource. The subject is too large for a full discussion in a letter not intended to deal specially with manning. It will be sufficient to say that on our side of the Channel we may learn a lesson from that statesmanlike creation of Colbert, the French Inscription Maritime. In so far as it is possible, under a system of voluntary enlistment, to attract men to the sea, to train them, and to hold them to the service of their country in war, the paternal methods of the French Administration might with advantage be followed by the British Admiralty.

With these brief observations on the manning of the Navy I turn to the strength in ships, to which recent criticism has been mainly directed. To give a convincing answer to experts who take pessimistic views, and a reasonable assurance to the public, a detailed statement is necessary, at least with reference to the most important classes of ships.

The first-class battleships are the main strength of the Navy. The list below gives the ships of Great Britain, France, and Russia,

FIRST-CLASS BATTLESHIPS.

GREAT BRITAIN.

No.	Type.	Displacement.	Date of Launch.	Total Tonnage.
8	Empress of India	14,150	1891–92	113,200
9	Majestic	14,900	1894–96	134,100
1	Renown	12,350	1895	12,350
6	Canopus	12,950	1897–99	77,700
8	Formidable	15,000	1898–99 (Two building)	120,000
6	Duncan	14,000	1900–1	84,000
3	New type	16,500	To be laid down	49,500

41 ships. Collective displacement, 590,850 tons.

FRANCE.

Type.	Displacement.	Date of Launch.
Brennus	11,395	1891
Carnot	12,008	1894
Charles Martel	11,880	1893
Jauréquiberry	11,824	1893
Massena	11,924	1895
Bouvet	12,200	1896
Charlemagne	11,275	1895
Gaulois	11,275	1896
St. Louis	11,275	1896
Jéna	12,052	1898
Suffren	12,728	1899
Patrie	14,865	Building
République	14,865	Building

13 ships. Collective displacement, 159,566 tons.

FIRST-CLASS BATTLESHIPS—*continued.*

RUSSIA.

No.	——	Displacement.	Date of Launch.
2	Tri Sviatitelia	12,480	{1892 1900
3	Petropaulosk	10,960	1894–95
3	Oslabya	12,674	1898–1900
1	Retvisan	12,700	1900
1	Cesarevitch	13,110	1901
4	Borodino	13,600	Building.

14 ships. Collective displacement, 159,566 tons.

with their tonnage. The dimensions are an essential element in the case. In dealing with ships of even date it is safe to assume that the relative fighting efficiency may be measured by displacement. A constant growth in dimensions has been accepted, though not without certain disadvantages, because the gain in armament, protection, speed, coal endurance, and sea-keeping qualities has been held to justify the cost.

In battleships of the second class the British Fleet is much below the combined strength of France and Russia. We have 11 ships as against France ten and Russia also ten ships, the date and average dimensions of the ships of the three Powers being approximately the same. In France and Germany the policy of bringing the older ships up to date is viewed with more favour than in this country. Our inferiority in numbers of battleships of the second class is the more conspicuous because we are reluctant to spend money on modernising machinery and armaments.

In third-class battleships, coastguard, and port defence ships our strength is above the two-Power standard. Our list of ships includes the Alexandra, Colossus, Edinburgh, Devastation, Dreadnought, Inflexible, Superb, and Téméraire. Our ten third-class battleships have an aggregate displacement of 94,690 tons. France has 11 ships, aggregate displacement 74,932 tons; Russia has only one third-class battleship, launched in 1872.

In the coastguard and port defence list Great Britain has 17 ships, including the Agamemnon, Ajax, Hercules, Monarch, Conqueror, Hero, and Rupert. The total displacement of our ships in this class is 107,330 tons. France has 14 coast defenders, total displacement 43,025 tons; Russia 16 ships, 51,810 tons. Eight of the French ships and four Russian are armoured gunboats, not available for offensive operations.

We have now to deal with the cruisers. In all classes, and especially the first class, Great Britain is strong, far beyond the two-

Power standard. The following is a list of British first-class cruisers:—

No.	Type.	Displacement.	Date of Launch.	Aggregate Displacement.
				Tons.
2	Impérieuse	8,410	1886	16,800
2	Blake	9,000	1889	18,000
4	Crescent	7,700	1892	30,800
5	Edgar	7,350	1890	36,750
2	Powerful	14,200	1895	28,400
8	Diadem	11,000	1896	88,000
6	Cressy	12,000	building	72,000
4	Drake	14,100	building	56,400
16	Monmouth	9,800	building	156,800

We possess a total of 49 ships, mostly of the latest types. Displacement, 503,950 tons. France has 19 first-class cruisers, total displacement, 181,065; Russia 13 ships, displacement, 104,063 tons.

In the second class Great Britain has 62 cruisers, aggregating 240,180 tons; France 23 ships, 108,024 tons; and Russia seven ships, 36,496 tons.

Great Britain has 44 third-class cruisers, France 13, Russia five ships. The average tonnage of the British and French ships is approximately the same. The Russian ships are larger.

Omitting the smaller classes, Great Britain has 34 torpedo gunboats, France 21, Russia nine. Destroyers—Great Britain 111, France 31, Russia 49.

At this stage reference may be made to the state of the Fleet in the Mediterranean. More cruisers and destroyers are needed. If, however, there is a deficiency in any naval arm in the Mediterranean, it is not because no vessels are available, but because they have been placed elsewhere. For the distribution of our naval forces the Admiralty is responsible. The action taken may possibly have been in compliance with Cabinet instructions. As a general observation, it may be remarked that we keep large squadrons on distant stations where the flags of foreign Powers are seldom seen, in deference to traditions with which we are reluctant to break, but which have ceased to be applicable in an age of telegraphy and steam.

While the British Navy has been brought fully up to the two-Power standard in the number and tonnage of the battleships and cruisers in the most important classes, in the designs for every type we have made constant progress. If the ideal of the perfect ship of war is never reached, we may at least claim that Sir William White and his able staff have produced battleships not surpassed in any navy, and cruisers with which there is no fault to find except on the ground of size and cost. The demand for protection by vertical

armour, and the construction of very powerful vessels for other navies, such as the Gromoboi, 12,236 tons, for Russia, and the three fine cruisers of the Léon Gambetta type, 12,416 tons, for France, have brought us to the 14,100 tons of the Drake class. It has been necessary to build ships of the Drake type for special service. For the general duties of protection of commerce it does not as yet seem desirable to exceed the 9800 tons displacement of the 16 cruisers Monmouth class. Their speed of 23 knots is the same as that of the Drake. They are generally armed with 14 6-inch quick-firers and protected by 4 in. armour on the belt and casemates. Seven ships of the same class are built and building for the French Navy.

It now remains to compare the rate of progress in shipbuilding. It may be measured roughly by expenditure. Our Navy Estimates for the current year provide £9,003,256 for new construction, as against a proposed expenditure of £3,932,148 for France and £2,492,128 for Russia. Our appropriation exceeds that of the two Powers by more than two and a half millions, and we build more cheaply. The subject has been carefully examined by a committee of French shipbuilding officers. They have reported that we pay less for labour, and buy the raw materials for shipbuilding at lower prices than those obtained by French manufacturers.

A few examples may be given.

BATTLESHIPS.

ENGLAND.

	Tons.	
Implacable . .	15,000 (building)	£1,002,909
Irresistible . .		£986,731

FRANCE.

	Tons.	
République . .	14,865 (building)	£1,421,708
Patrie . . .		

ARMOURED CRUISERS.

ENGLAND.

	Tons.		
Cressy . . .	12,000	Building at Fairfield . .	£723,012
Hogue . . .		Building at Barrow . . .	£724,472
Sutlej . . .		Building at Clydebank . .	£733,625

FRANCE.

	Tons.	
Jules Ferry .		
Gambetta . .	12,416 (building)	£1,169,940
Victor Hugo .		

PROTECTED CRUISERS.

ENGLAND.

	Tons.	Launch.	
Hermes	5600 . . .	1898 . . .	£278,349

FRANCE.

	Tons.	Launch.	
Jurien de la Gravière .	5605 . . .	1899 . . .	£475,979

2 F

Well and wisely spent, the vast sum now available for new construction for the British Navy should be sufficient. Let not the liberality of Parliament induce a relaxation of pains and thought in those who administer and design. We must not be content to keep abreast of immediate requirements. In so far as it may be possible a forecast must be made of the developments of the future. We must rigidly keep out of the building programme everything of the second best. In every type we must build the best. Upon a close scrutiny there seems no reason to take exception to any part of the great shipbuilding work now in hand.

In the present state of naval science the requirements of the near future may be classed as follows:—

Class.	Sphere of Action.	Types.
Battleships . .	Mediterranean and Channel .	Majestic. improved.
	Atlantic and distant stations	Canopus and Admiral class, reconstructed.
Armoured cruisers	Special service	Drake.
	Protection of commerce . .	Monmouth.
	Scouts	High speed and long coal endurance with a light armament should be the leading features in the Scout class. The Terrible type is too large. The Isis type with increased coal endurance is highly efficient for the Mediterranean.
Torpedo . . .	Fleet auxiliaries	Destroyers, improved, armoured torpedo rams.
	Harbour defence	Torpedo boats, submarine boats.

By night the unarmoured destroyer is a dangerous foe to a powerful battleship. In a daylight attack a gunless armoured torpedo-ram of high speed and great manœuvring powers would be most formidable. Looking to the power to deal a decisive blow with the ram or torpedo below the belt from vessels which could be built in numbers for the cost of a single battleship, the constant increase in the dimensions of ships affords grave occasion for reflection. Confidence is placed, both in the United States and France, in the capabilities of the submarine boat for harbour defence. The decision taken by the British Admiralty to commence building a submarine flotilla will command approval.

In conclusion, we have seen that in men and ships the British Navy is distinctly above the two-Power standard. Whether that standard is sufficient is a political rather than a naval question, not to be disposed of satisfactorily in a letter dealing with the bare facts of the situation, and in which nothing argumentative would suitably find a place.

If we have vast interests at stake, our commercial policy is liberal, we are unaggressive, and we do much to promote the welfare of the whole human race. There is no reason, therefore, to be apprehensive of unprovoked attacks from a wide combination of foes. Nor is it statesmanship to exhaust the country in preparations not called for by the present circumstances. We adapt our policy to that of other Powers. If they increase their fleets we must meet them.

Potentially the United States are first among the maritime Powers. But England is the mother-country of English-speaking men. We look on the gallant seamen of the Western Republic as kinsmen and allies. Our fleets may act together in support of a common policy of the open door.

I have the honour to be, Sir, your obedient servant,

Lagos Bay, Sept. 9, 1901. BRASSEY.

II.

THE FLEET ON FOREIGN STATIONS.

To the Editor of "The Times."

Sir,—I have recently been permitted to place before the readers of *The Times* a statement showing the strength of the British Navy in men and ships. The present communication deals with the distribution of our naval force. With a decided superiority in the number of sea-going ships in commission, we should be well able to hold our own in every sea. If, as it has been alleged, the Mediterranean Fleet is deficient in vessels of any type, they should be drawn from distant stations where our supremacy is unchallenged. With these introductory remarks we may proceed to examine the position.

We may begin with the Mediterranean, combining the Channel Fleet as its western division with the squadron maintained in the Mediterranean as its eastern division. The following table, compiled

without access to the latest official information, will be sufficiently accurate for the purpose in view:—

TABLE I.—MEDITERRANEAN AND BLACK SEA (including British Channel Fleet).

	Great Britain.		France.		Russia.	
	Ships.	Tons.	Ships.	Tons.	Ships.	Tons.
Battleships—						
First-class	18	269,000	6	69,729	2	24,960
Second-class.	1	9330	—	—	6	58,000
Coast defence	1	5440	1	4849	1	3590
Cruisers—						
First-class	4	40,350	—	—	—	—
Second-class.	6	31,400	5	22,958	—	—
Third-class	7	13,985	3	6999	1	1492
Torpedo gunboats	4	4020	7	6000	—	—

Destroyers.—Great Britain, 14; France, 6.
Submarine.—France, 2.
Auxiliary vessels.—Great Britain—Vulcan (torpedo depôt), Maine (hospital), Tyne (troopship). France—Foudre.

In the Mediterranean the superiority of the British Fleet to a two-Power standard in battleships is beyond question. We are weak in cruisers, not, indeed, as compared with other Powers, but in proportion to our strength in battleships. Our second-class cruisers of the latest type, 5,600 tons, should be large enough for service in an inland sea. It will be suggested later that some vessels of the class referred to could be detached from distant foreign stations for reinforcement of the Fleet in the Mediterranean.

The Channel Fleet should be strengthened in cruisers. They should be of the most powerful type. The Navy Estimates of last Session provided for the completion in the year 1901-1902 of six first-class cruisers, five being of the Cressy type.

To hold the Channel and defend our coasts and home ports we have the Reserve Squadron, the port guardships, the Cruiser Squadron, the sea-going gunnery ships, and the Instructional Flotilla. The force available is shown in the comparative table.

(See Table II. on opposite page.)

It is not the policy of Russia at the present time to maintain a naval force in northern waters outside the Baltic. The entire available strength in sea-going ships is concentrated in the China Seas.

In existing conditions our battleships in home waters should be sufficient. It is an admitted weakness in our own Reserve Squadron, to some degree noticeable also in the French Northern Squadron, that it is constituted mainly of ships not of recent design. By

TABLE II.

GREAT BRITAIN.—Reserve and Cruiser Squadrons, Port Guardships, Instructional Flotilla.
FRANCE.—Northern Squadron.
RUSSIA.—Baltic Fleet.

—	Great Britain.		France.		Russia.	
	Ships.	Tons.	Ships.	Tons.	Ships.	Tons.
Battleships	11	119,000	7	81,865	1	9900
Armoured ships, coast defence	2	12,400	4	26,423	8	27,000
Cruisers—						
Armoured	4	22,400	2	11,169	—	—
First and second class	4	22,950	3	15,000	—	—
Third-class	4	8750	2	4000	3	9930
Torpedo gun vessels	15	11,960	1	958	—	—
Torpedo vessels and destroyers	24	—	12	—	—	—
Submarine	—	—	4	—	—	—

judicious reconstruction our Admiral class could be strengthened by giving protection to the central battery, thus making them efficient for service on foreign stations, where few battleships of the most modern type will be found under the flags of other Powers. The Admiral type should be taken in hand as soon as the numerous powerful battleships now in progress are completed and available for the reinforcement of our squadrons in European waters.

In cruisers on the home station we have a decided superiority. It would be difficult to say how many would be sufficient for the defence of our vast commerce converging on the Channel. The 16 armoured cruisers of the Monmouth class will give a much-needed addition to the fleet.

On the China Station powerful squadrons have been formed under the British, French, and Russian flags.

(The position is shown in the table on next page.)

In the circumstances of the hour, our strength in Chinese waters is a question rather for the Cabinet than the Admiralty. It has been deemed necessary, in deference to political considerations, to bring up the British naval force to a level, approximately, with the combined strength of France and Russia. Influence with European Powers, in so far as it rests on armed forces, depends in a great degree, if not mainly, on the strength near home. In the late negotiations France, with only one second-class ironclad on the China Station, and the United States, with no battleship in those waters, have spoken with as much authority as Great Britain, although our flag was shown on five battleships of the most powerful type.

Table III.—China Station.

	Great Britain.		France.		Russia.	
	Ships.	Tons.	Ships.	Tons.	Ships.	Tons.
Battleships	5	60,000	Redoutable.	3767	5	51,206
Cruisers—						
Armoured	2	11,200	—	—	6	55,623
First-class protected	4	41,550	2	16,391	—	—
Second-class	6	29,000	3	12,000	—	—
Third-class	3	7295	—	—	2	2500
Armoured Coast Defence Gunboats	—	—	2	3500	2	3000
Sloops	3	—	2	—	6	—
Gunboats	10	—	6	—	2	—
Destroyers	6	—	—	—	—	—
Despatch vessel	Alacrity.				Icebreaker: Silatch.	
Store ship	Humber.		Troopships:— Mytho. Nile. Vinh-long.		Torpedo Gun Vessel: Gaidamak.	
Surveying ship	Waterwitch.					

Having a continuous chain of fortified coaling stations, it is the less necessary in time of peace to weaken the British Fleets in the Mediterranean and on the home station. The ships of foreign Powers are largely dependent on facilities only obtainable in British ports. For our own ships those facilities would in all circumstances be available. We have that exclusive advantage.

In the Atlantic, including the Cape, the North American, and the South-East Coast of America Stations, Great Britain has a decided preponderance over the two-Power standard:—

Table IV.

—	Great Britain.		France.	
	Ships.	Tons.	Ships.	Tons.
Armoured ship	Monarch	8845	—	—
Cruisers—				
First-class	2	15,400	Tage Isly	7589 5500
Second-class	6	26,800	2	7587
Third-class	6	12,645	1	2410
Sloops	5	4520	—	—
Gunboats	7	5430	—	—

While the war continues in South Africa it will be the duty of the Admiralty to maintain a squadron on the Cape Station fully

adequate to any emergency. On the east coast of America the United States is the dominant and a friendly Power. Supervision of the fisheries on the coast of Newfoundland and the naval police of the West India Islands are the chief duties of our squadrons. Few vessels only, and chiefly of the smaller class, are required as a permanent force. Our flag may be shown from time to time in American waters and the Canadian ports by our Cruiser Squadron.

For the training of officers and men, it can scarcely be claimed that the North American compares favourably with the Channel or Mediterranean or Cruiser Squadrons. If the south-east coast of America were included in the North American command the squadron might be reduced. The second-class cruisers Indefatigable and Tribune and the third-class cruisers Pallas, Proserpine, and Psyche would be a valuable addition to our Mediterranean Fleet. A squadron which would include the first-class cruiser Crescent, the second-class cruisers Cambrian and Charybdis, the third-class cruiser Barracouta, and four sloops should be fully equal to the ordinary peace duties of the American Station. It could be promptly reinforced.

Combining the Australian Station with the Pacific our squadron is constituted as under:—

TABLE V.—PACIFIC (INCLUDING AUSTRALIA).

—	Great Britain.		France.	
	Ships.	Tons.	Ships.	Tons.
Cruisers—				
Armoured	1	8400	—	—
First-class	1	7700	—	—
Second-class	2	8600	Protet	4065
Third-class	7	12,920	D'Estrées	2500
Sloops	3	3000	—	—
Torpedo gunboats	1	735	—	—
Gunboat	1	805	—	—

Our squadrons in the Pacific are our reserve for China. A strong representation of the Imperial Navy in Australia and at Vancouver fosters a patriotic sentiment, and so fulfils a political object of the highest importance. It does not appear desirable to reduce the present strength. On the contrary, our Australian Squadron should be reconstituted as recommended by Admiral Beaumont. The third-class cruisers, which form the bulk of the present squadron, are too short to keep their speed against heavy seas. They should be lent to

the Government of the Australian Commonwealth. As an instructional flotilla they would be useful for the training of the local Naval Reserve. They would also be effective for harbour defence in case of attack by hostile cruisers on ports, such as Brisbane, Melbourne, or Adelaide, situated on inland seas. The three second-class cruisers of the 5600 tons type now in the Reserve for the home ports are available for commissioning for the Australian Station. Their length of 320ft., as against the 265ft. of the Mildura class, gives them a decided superiority as cruisers. Reconstituted as proposed, the Australian Squadron would include the first-class cruiser Royal Arthur, three modern second-class cruisers, to be increased as vessels become available, with masted sloops or first-class gunboats for the police of the islands.

It should shortly be possible to detach two or three of our best second-class cruisers from our large force in China to the Australian Squadron. As it has already been suggested, that squadron is a reserve for China. The French are making considerable reduction in their naval force in Chinese waters.

The fleet on the East India Station is shown in the following table:—

Table VI.—East Indies.

—	Great Britain.		France.	
	Ships.	Tons.	Ships.	Tons.
Cruisers—				
Second-class	1	5600	1	4065
Third-class	4	8990	1	2452
Gunboats	3	1275	1	505

It would seem desirable to reduce the Imperial naval force on the East India Station to a commodore's command. The fast third-class cruisers Pomone and Perseus are more suitable for the Mediterranean than the Tropics. They could be replaced, if necessary, with cruisers of a larger and earlier type, such as the third-class cruisers on the Australian Station, which are perhaps more efficient for the police of the seas in hot latitudes. The Indian Government should be encouraged to strengthen their local navy. It already includes two armoured ships for the defence of Bombay Harbour, numerous gun-vessels, torpedo-boats, troopships, and other steamers.

The officers of the Indian Marine have the honour of being

included in the British Navy List. The *esprit de corps* is keen. It would give sensible relief to the Imperial Navy if some portion of the trying duties on the coasts of Burma and the Persian Gulf were to be handed over to the Indian Marine, which should be placed under the command of a Rear-Admiral. Such an arrangement would give additional men for our European squadrons.

In peace we look to the Imperial Navy as essentially a training service. Training will be most thorough in powerful squadrons of exercise under close supervision on the part of the Admiralty. It is difficult to make it as perfect as we could wish in distant waters, in trying climates, and in the weariness of prolonged isolation. If we turn to political considerations, it is certain that the nearer the force and the more often in evidence the deeper the impression which it produces. Witness the Jubilee review. The statistical position, if the phrase may be used, was a matter of common knowledge. It had produced no such impression, even on those best informed on naval matters, as did the array of ships at Spithead. Our squadrons on those foreign stations where the flags of other Powers are rarely seen are maintained in deference to traditions handed down from the distant past, when the present facilities for communication by telegraph and steam were unknown, and when it was necessary to have a force on the spot to give protection to British interests in remote countries. Under the changed conditions the necessity is no longer urgent—*pace* those lonely Consuls who would be made of sterner stuff than common human nature if they did not sometimes long for the pleasant companionship of a naval friend. For the defence of our coasts, our communications, and our commerce we should be better prepared for every eventuality by a policy of closer concentration.

Before concluding, it seems proper to draw attention to the dispersion of the *personnel* of the British Navy in vessels useless for fighting purposes. While the number of vessels of all kinds built and building in the British Navy is 695, in this year's published return of fleets of the Powers, as analysed by the American Naval Intelligence Department, we are credited with not more than 477 ships built and building, including ten vessels armed with muzzle-loading guns and the whole of our 99 torpedo-boats. The vessels excluded are old gunboats, training brigs, store ships, surveying ships, and school ships.

In the opinion, therefore, of an impartial authority, we are maintaining some 218 vessels which, however useful some of them may be to assist the Navy, are useless for fighting purposes. It

should be possible to reduce the number of non-combatant and harbour ships.

I have the honour to be, Sir, your obedient servant,

4, Great George Street, S.W. BRASSEY.

October 31, 1901.

P.S.—It may be desirable to append the names of warships actually in commission on those stations on which a reduction of strength has been proposed:—

ATLANTIC.

GREAT BRITAIN.

Armoured ships .	Guardship.—Monarch. Port Guardship.—Hotspur.
Cruisers	First Class.—Crescent, Gibraltar. Second Class.—Cambrian, Charybdis, Indefatigable, Tribune, Forte, Terpsichore. Third Class. — Barracouta, Blanche, Philomel, Pallas, Proserpine, Psyche.

FRANCE

Cruisers	First Class.—Tage, Jurien de la Gravière. Second Class.—Isly. Third Class.—D'Estrées.

EAST INDIA STATION.

GREAT BRITAIN.

Cruisers	Second Class.—Highflyer. Third Class.—Cossack, Marathon, Perseus, Pomone.
Gunboats . . .	Lapwing. Assaye, Plassey (Indian Navy).

FRANCE.

Cruisers	Second Class.—Catinat. Third Class.—Infernet.
Gunboat	Scorpion.

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